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HUDSON AND FULTON

A BRIEF HISTORY OF HENRY
HUDSON AND ROBERT FULTON
WITH SUGGESTIONS DESIGNED
TO AID THE HOLDING OF GEN-
ERAL COMMEMORATIVE EXER-
CISES AND CHILDREN'S FESTI-
VALS DURING THE HUDSON-
FULTON CELEBRATION IN 1909

By EDWARD HAGAMAN HALL, L.H.M., L.H.D.

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BY

THE HUDSON-FULTON CELEBRATION COMMISSION
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LAST VOYAGE OF HENRY HUDSON

From painting by Hon. John Collier in the National Gallery of British Art (or Tate Gallery) London, Eng., representing Hudson and companions abandoned by his mutinous crew in Hudson Bay, June 22, 1611.

INTRODUCTION

From September 25 to October 9, 1909, the State of New York, under the auspices of the Hudson-Fulton Celebration Commission, will commemorate with appropriate exercises the 300th anniversary of the discovery of the Hudson River by Henry Hudson in 1609, and the 100th anniversary of the successful inauguration of steam navigation upon the same river by Robert Fulton in 1807.

While, on account of the nature of the events commemorated and the necessity for a certain amount of concentration in order to make the commemoration effective, a large part of the celebration will take place along the Hudson Valley, yet the people of the whole State cannot fail to take a lively interest in it. The discovery of the Hudson river and the successful application of steam to navigation were local events only in a narrow sense of the term. In effect they were of state-wide, national, and even international significance. One brought to the knowledge of Europe and opened up to civilization the great river to which, more than any other single natural factor, is due the greatness of New York as the Empire State and New York City as the Metropolis of the New World. The other has given to all the navigable waters of the earth a value which they did not previously possess, has reduced the ocean's waste, in point of time, to one-sixth its former dreary breadth, and has promoted the neighborliness of nations to a degree which cannot readily be estimated. These events have contributed greatly to the advancement of civilization, and it is a just cause for State pride that they occurred within our borders.

Not the least of the beneficent effects of the order of nature which causes time to move in cycles, is the powerful influence of the association of ideas which accompanies anniversaries. If the universe were stationery, and we had no alternation of light and darkness and seed time and harvest, we should lose not only the physical benefits which

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come from those alternations, but we should also lose the means by which to measure time; we should have no anniversaries; and we should lack a strong help to human advancement. Civilization progresses partly by memory of, comparison with and improvement upon, past events. And anniversaries, eloquent with memories, come to us like ministering spirits of the past to remind, to teach, to admonish and to inspire the present. Thus they recompense us somewhat for the slipping by of the years.

So come these two cardinal anniversaries in the history of our great State; and it is proper that our people should pause in their customary occupations and take time for the contemplation of the thoughts which the anniversaries stimulate. This is particularly true of the Universities, Colleges, Public Schools, and Learned Societies throughout the State. In the programme as prepared by the Hudson-Fulton Celebration Commission, one day, Wednesday, September 29, called General Commemoration Day, has been designed especially for appropriate indoor observances in such institutions. The Chairman of the Committee on General Commemorative Exercises is President Jacob Gould Schurman of Cornell University, Ithaca, N. Y. In a similar way, Saturday, October 2, called Carnival Day, has been designated as the appropriate day for Children's Festivals out-of-doors. The chairman of the Children's Festival Committee is Hon. Samuel Parsons, Landscape Architect of the Parks of New York city, 1133 Broadway, New York.

The authorities, students and members of all educational institutions and learned societies, as well as the children of the State of New York, are earnestly invoked to make due observance of the Hudson-Fulton anniversaries, either upon the days named or upon such other day or days during the two weeks' celebration as may be most convenient.

With a view to helping such observances, the following pages have been prepared.

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PART I.

THE DISCOVERY OF THE HUDSON RIVER.

Geographical Knowledge in Hudson's Day.

Between September 2 and October 4, 1609, Henry Hudson, an English navigator sailing under Dutch auspices, explored the river which bears his name in what is now called the State of New York.

To realize the importance of that voyage, it is necessary to recall the incomplete state of geographical knowledge of America 300 years ago, and the extremely slight hold which European civilization had upon this continent at that time.

At the beginning of the seventeenth century, European acquaintance with North and South America, with exceptions to be noted hereafter, was confined almost exclusively to the sea shore. Between the advent of the Norsemen upon the New England coast in the year 1000 or earlier, and Sir Francis Drake's voyage to the Pacific in 1579, navigators of various nationalities had in a general way followed the continental borders from Baffinland down along Labrador, Nova Scotia, the Eastern United States, the countries bordering the Gulf of Mexico and Caribbean sea and the eastern coast of South America, passed through the Straits of Magellan, and gone up the western side of South America and North America as far as Oregon. But while that was true, European knowledge of the Americas was extremely rudimentary for several reasons:

First, in most of these voyages the coast was touched only at intervals and known only in its most prominent features. Details had been examined very little.

In the next place, precise observations of latitude and longitude and precise surveys, which are the basis of accurate map-making, were impossible at that time on account of the crude instruments used in navigation and the correspondingly undeveloped state of marine science.

In the third place, it was an age when, on account of national rivalries, explorers did not freely disclose their dis-

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coveries to the world at large, so that there was difficulty in collating, comparing and correcting the observations of different navigators.

For these reasons, the maps of the coasts of the New World prior to Hudson's time were incomplete, incorrect, and absurdly distorted.

Within these curiously disproportioned continental outlines, the country was almost unknown. The Saint Lawrence river had been penetrated as far as Montreal and Quebec settled in 1608. At Port Royal, Nova Scotia, the French had planned a settlement but it was abandoned in 1607. One or two of the larger rivers of Maine had been entered for a short distance and an English settlement had been made at Pemaquid but it was abandoned in 1608. The Hudson river had been entered but there was no general knowledge concerning it. The James river, in Virginia, had been explored as far as the falls at Richmond, and the first permanent English-speaking settlement in America had been made at Jamestown, Virginia, in 1607. In 1608 Captain John Smith explored the Chesapeake Bay, but the really remarkable map which was drawn from his explorations was not published until 1612. From Virginia southward another dreary stretch of uncivilized coast reached to Florida. There the St. John's river had been entered and a colony attempted by the French, but the colony had been wiped out by the Spaniards, who founded St. Augustine in 1564. Ponce de Leon who landed in Florida and De Soto who discovered the Lower Mississippi, contributed little to accurate geographical knowledge. Information about the interior of the Americas was confined almost entirely to Mexico and Peru, from which the Spaniards had extracted, under a system of slavery worse than Egyptian, the gold and silver which had made them in the 16th century the most powerful civilized nation in the world. From Mexico as a base, the Spaniards had explored the southwestern United States as far north as Kansas and had made some interesting discoveries, such as those of the Grand Canyon of the Colorado river, the Pueblos of the southwestern Indians,

etc., but they had planted within the present limits of the United States only one settlement, other than St. Augustine before mentioned, namely, Santa Fe, N. M.

That, in brief, was what the Old World knew geographically about the New. It will thus be seen how little was known in Hudson's day about North America north of Mexico; and with only four permanent settlements north of the Rio Grande, namely at Quebec, Jamestown, St. Augustine and Santa Fe,* there were few bases on the continent from which further explorations could be made. Dependence, therefore, was still placed on European navigators for additional information. Under such conditions, it is apparent that the thorough exploration of a great river like the Hudson, and the revelation of its commercial possibilities to what was then the most enterprising commercial people of Europe, was a very valuable addition to the Old World's knowledge of the New.

In order that there may be no misconception as to the nature of the honor accorded to Hudson, it should be said in passing that it is not claimed that he was the first to learn of the existence of the river which bears his name. The word "discover" does not necessarily mean to see a thing first. Its primary meaning is to uncover or to lay open to view; hence, to show, to exhibit, or to make known. Columbus was not the first person to discover America, for the Norsemen had discovered this continent five hundred years before Columbus' famous voyage; and yet we justly call Columbus the discoverer because he made his knowledge useful to mankind.

So it was with Hudson. The sharp re-entrant angle in the Atlantic coast which marks the outlet of the Hudson river had not escaped the notice of earlier navigators, and the bend in the shore line and the river itself were clearly delineated on maps made before Hudson's day. We even know the names of some of his predecessors in New York harbor. The earliest European visitor to these waters of whom we have indisputable proof was Verazzano, who came

* At Quebec there were only eight survivors in 1609. At Jamestown there were about 200.

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in 1524. He referred to the upper harbor as a beautiful lake and to the river as "una grandissima riviera"—a very large river. He was followed in 1525 by Gomez, who named the river after St. Anthony. Thus, without taking into consideration the less easily demonstrated but not improbable claims that French, Spanish and even Dutch traders had restored to the river between 1525 and 1609, it is apparent that so far as the undisputed records are concerned, Verazzauo had found the stream and Gomez had named it eighty-five and eighty-four years respectively before Hudson sailed from Amsterdam.

But notwithstanding all this, it remains that Hudson was first to give to the world an authentic record of careful exploration of the river to the head of navigation and in the true sense of the word to "discover" to mankind the extent and resources of this great stream. The association of his name with the river is perhaps one of the strongest evidences of the common consent with which he was recognized in the 17th century as the navigator to whom the nations were chiefly indebted for their knowledge of the stream. We are well justified, therefore, in calling Hudson the discoverer of the river and in according him honor as such.

Status of the World Powers in 1609

In order to understand the conditions under which Hudson made his voyage in 1609, it is necessary to glance at the status of the world powers which at that time was very different from their status to-day.

The three leading factors in the political and commercial world in 1609, so far as the discovery of the Hudson was concerned, were Spain, England, and the Netherlands. Portugal had made important discoveries in the past and had a valuable commerce, but in 1609 she was an appendage of Spain and can be disregarded. France had for years been engaged in complicated political intrigues, trying to play off Spain, England and The Netherlands against each other for her own advantage, and, with an exception to be noted hereafter, she also can be disregarded in this connection.

Spain had but lately passed the zenith of her greatness. For a long time prior to 1588 she had been the greatest political, military and naval power on the face of the earth, her possessions in the Americas, Europe, Africa and Asia constituting the first empire upon which it could truly be said the sun never set. It is almost impossible to-day to realize the tremendous strength of Spain in the 16th century and even well into the 17th.

For forty years, prior to 1609, every resource which Spain's wealth and influence could command had been employed in an effort to crush and subjugate the Netherlanders, but without success, and in 1609 a twelve years' truce had been agreed upon. Thus, while there was nominally peace between the two countries, there was an intense hatred on the part of the Netherlanders for their hereditary enemies, which was one of the stimulating causes for Hudson's voyage, as we shall see later.

Spain had also recently been at war with England, so that the English and Dutch peoples had much to draw them together in common sympathy against the Spaniards. In 1588, Spain had started out with her so-called Invincible Armada to invade England, but the English, (aided by the Dutch who detained Spanish forces in The Netherlands) destroyed the Spanish fleet and thus effectually broke the Spanish sea-power. English merchants, and the English government to a smaller extent, had reciprocated the help of the Netherlanders by sending them money to aid them in their war with Spain, so that although, in 1609, Spain and England were apparently on friendly terms, there was no love lost between them.

England, Hudson's native country, had just passed through one of the most glorious periods of her history. During Queen Elizabeth's reign, the English sea-kings had won those great naval victories which laid the foundation of England's maritime greatness; manufacture and commerce had been stimulated; exploration had been encouraged; genius had been inspired; and Shakespeare and Spenser had shone in the literary world. The spirit of dis-

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covery and commercial enterprise aroused in Elizabeth's reign did not abate in 1603 when James I ascended the throne, and had an important influence on Hudson's career. In 1566, Parliament had incorporated "The Fellowship of English Merchants for the Discovery of New Trades," called for the sake of brevity the Muscovy Company, or Russia Company. Their trade was primarily with Russia. Christopher Hudson — possibly a relative of Henry Hudson — was one of the promoters of the Company. The formation of the Muscovy Company was followed by the organization of other similar corporations — the Turkey Company in 1581, the Morocco Company in 1585, the Guinea Company in 1588, and others. But the great commercial prize for which the nations were contending was the rich trade with the East Indies, and in 1600, the English East India Company was formed for oriental commerce.

In every direction in which the English carried their sea traffic they encountered the keenest competition from the Dutch, for however friendly the two peoples were politically, they were jealous rivals commercially. So greatly did the Dutch encroach upon the English trade with Russia in particular, that just prior to Hudson's voyage in 1609, we find the English Muscovy Company and the English East India Company co-operating in an effort to find a passage to the treasures of the orient either around the north of Europe and Asia or around or through North America. It is here that we have the keynote to all four of Hudson's voyages.

Hudson's first recorded voyage was contemporaneous with two other important English events affecting American history. One was the planting of the first permanent English-speaking colony in the New World as Jamestown in 1607; the other was the flight of the Puritans from England to Holland. Both were related to the history of the Hudson river, for Captain John Smith sent from Virginia to Henry Hudson certain information which led Hudson to explore the Hudson river; and the other led eventually to the emigration from Holland of the Pilgrims, who

started for the Hudson river but actually landed at Plymouth. (See footnote on page 831.)

Turning now to the people under whose auspices the Hudson river was explored and New York was first settled: The Netherlands had been at war with Spain for forty years, and in 1609 had paused to catch breath in preparation for forty years more of struggle. The resistance of The Netherlands to the domination of Spain constitutes one of the most extraordinary and thrilling chapters in human history. The Dutch were lovers of law and liberty, and their war for independence was wonderfully like our own. Philip II had deprived them of the popular suffrage which they had enjoyed by ancient charters; he forced foreign governors upon them; he quartered Spanish soldiers among them; he slew thousands of them on account of their religion. Then there rose up among them a great man, like our Washington of later times, William the Silent, who sold all his valuables and consecrated himself to the cause of the people. Under his heroic leadership the little Netherlands revolted against powerful Spain in 1568 just as the American colonies revolted against England in 1775; in 1581 they adopted a Declaration of Independence which was a model for our Declaration of Independence in 1776; and they fought against tremendous odds until they established a Republic, just as the Americans did many years afterwards. The heroism of the Dutch people, whether fighting in boats on the sea, or on skates on the ice, or behind their walls on land, has never been surpassed. In the sieges of Harlem and Leiden and other cities, men and women stood shoulder to shoulder for Dutch liberties. In these terrible sieges, they had to contend not only with Spaniards but also with pestilence and starvation. After consuming their ordinary food they lived on dogs, cats and mice rather than surrender. Then they boiled old saddles, and the hides of oxen and horses. Then they devoured their boots and shoes; and then they ate the grass that grew between the stones of their streets. At Leiden, the Dutch cut the dikes and let in the ocean and the Span-

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iards fled lest they be swallowed up like Pharaoh and his army in the Red Sea.

In 1609, at the beginning of the twelve years' truce, the Dutch Republic was as populous as England and more wealthy. It was the manufacturing and commercial center of Europe; and Amsterdam, from which Hudson sailed, was the leading port of the world.

The people of The Netherlands were not only industrious, but with their universities and schools they were learned and cultured. They loved education. When, after the siege of Leiden, William of Orange offered the people of the city, as a reward for their heroism, the choice between the gift of a university and a remission of taxes, they chose the university, and thus came into existence the University of Leiden, which has given so many great men to the world. The Dutch people were, and still are, artistic and inventive. Their art galleries rival any in Europe. They dispute with Germany the honor of first printing from movable type. They gave the telescope, the microscope, the pendulum clock and many other great inventions to the world. They have aptly been called the "Yankees of Europe." Above all, they believed in liberty of conscience and religious toleration, and gave refuge to the oppressed of all Europe. Such was the character of the people who founded New Netherland, a part of which is now New York State, and although the Old Dutch government and the Old Dutch name have passed away, the influence of the Dutch character and institutions has been indelible.

As before stated, the Dutch were powerful competitors with England in water-borne commerce, and they had a stimulus to this which the English had not. The prolonged war with Spain had cost the Netherlanders a prodigious expenditure of treasure as well as of blood, and they realized that they could not maintain a successful struggle against their powerful antagonist unless they could replenish their purses. In the East Indies they saw a prize the winning of which would accomplish a two-fold result, namely, it would

increase their power to continue the fight with Spain indefinitely, while at the same time it would proportionately decrease the resources of the Spaniards. This led to the formation, in 1602, of the powerful Dutch East India Company, one of the most extraordinary corporate monopolies in the history of that period; and this, in turn, led to the founding of the Dutch empire in the East. It was under the auspices of this Company, formed primarily for the East India trade, that Hudson started on his voyage in 1609 under the circumstances to be narrated hereafter.

Henry Hudson the Navigator

It was in the midst of this commercial competition between England and The Netherlands, and while both peoples were dreaming of a northeast or northwest passage to the Indies, that Henry Hudson enters upon the stage of authentic history.

All that we know of Hudson is comprised within and between the years 1607 and 1611. He was a citizen of London and was probably born in that city or immediate vicinity, but we do not know the exact place and date of his birth, nor do we know the exact place and date of his death. He first appears, on April 19, 1607, with eleven sea-faring companions, in the little church of Saint Ethleburga, in London, partaking of Holy Communion prior to embarkation on his first recorded voyage. He disappears from view in the mists of the great Hudson Bay on June 22, 1611, set adrift with a few comrades by a mutinous crew to face the terrors of an unknown fate. We do not even know how he looked, for there is no authentic portrait of him, but fortunately we know his character by his works.

It is not to be imagined, however, that Hudson became the skillful and daring navigator that he was without hard schooling at sea, and we can give a fairly safe conjecture as to how he received his nautical training. Men of the name of Hudson were prominent and influential at that time and intimately identified with the Muscovy Company and the study of navigation. A Christopher Hudson of

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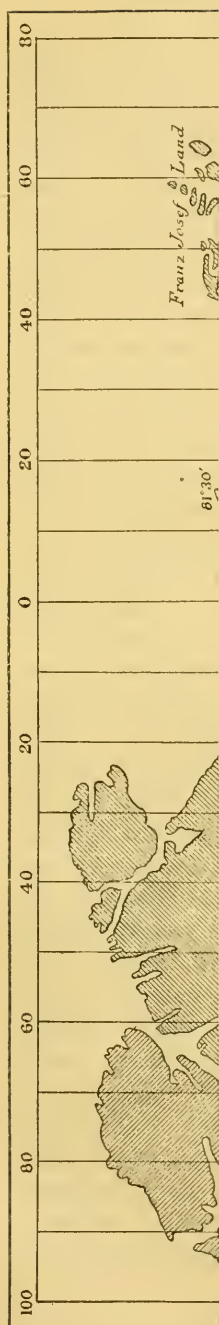
London, who was living at least as late as 1601 and was therefore contemporary with Henry Hudson, was a founder of the Muscovy Company under whose auspices Henry Hudson made his first voyage. In 1580 and 1581, there was in the employ of the Muscovy Company a Capt. Thomas Hudson who was a bold and skillful seaman. About the years 1581 and 1583 there was in London a Thomas Hudson — probably another Thomas — holding frequent conferences on marine affairs with such famous navigators as Sir Humphrey Gilbert, Sir Walter Raleigh, and Capt. John Davis, and with Richard Hakluyt, the great chronicler. Just what relation these and various other Hudsons of the time bore to our Henry Hudson we do not know, but we have here enough to show that the men of the name of Hudson were intimately connected with navigation, and to suggest that probably Henry Hudson had had extensive training in the service of the English Muscovy Company before it entrusted one of its valuable ships to his command. The nearest ancestor who can be claimed for Henry Hudson with any strong probability of accuracy is an alderman of London named Henry Hudson who is thought to have been the navigator's grandfather.

That Henry Hudson had a wife and children we learn from his contract with the Dutch East India Company in 1609, and that once of his children was a young son appears probable from the fact that he had with him on his first, second, and fourth voyages a boy named John Hudson.

It is evident that Hudson belonged to a prominent family, stood high in the esteem of the Muscovy Company and had some standing at Court, for on his last voyage he promised to have one Henry Green made a member of the Prince of Wales Guard, and, in 1612, vessels were sent out in search of him by the Prince of Wales' orders.

Hudson made four voyages of which we have records. The first, second and fourth were under English auspices, and the third under Dutch. (See accompanying map.)

The first was made from April 23 to September 15, 1607, in the employment of the English Muscovy Company in an





effort to reach China by passing between Greenland and Spitzbergen and across the polar region. His ship was named the "Hopewell." He reached a height of $81^{\circ} 30'$, a point nearer the pole than any other navigator up to that time, but baffled by the arctic ice, he returned to the Thames about four and a half months after he started.

In 1608, from April 22 to August 26, he made another voyage under the same auspices, probably in the same ship, and with the same object. At first he tried to pass between Spitzbergen and Nova Zembla and reached a height of $75^{\circ} 30'$, but was defeated by the ice. Then he returned southward and tried to find a way through the Nova Zembla group but failed. Thereupon he returned to England. On this trip, on June 15, Hudson recorded that two of his crew saw a real mermaid, half woman and half fish.

In 1609, Hudson entered the service of the Dutch East India Company and made his third historic voyage on the Half Moon.

On April 17, 1610, Hudson started on his last voyage, having been fitted out by a new English company formed under the auspices of the Muscovy Company, the English East India Company, and a number of patrons among the nobility. His ship was named the Discoverer. His object was to search for a northwest route to the Pacific Ocean through what is now called Hudson's Strait. In the following August he entered Hudson's Bay, spent the remainder of the season exploring it, and wintered there. During the winter Hudson's crew became violently disaffected with their master. They found fault with their limited allowance of provisions; they found fault with the strong discipline which he tried to enforce, and they found fault with his plans to continue his search for a westward passage when spring came. At length, on June 22, 1611, when in the eastern part of Hudson Bay, south of Cape Wolstenholme, the crew broke out in open mutiny. By force they put Henry Hudson, John Hudson, and seven others, mostly sick and disabled, into the shallop. In the boat were also a gun, some powder and shot, an iron pot, some meal, a chest of

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carpenter tools and a few other things. The mutineers then cut the shallop adrift and sailed away as fast as they could, leaving Hudson and his comrades in the terrible plight so powerfully depicted in Collier's famous painting entitled "Hudson's Last Voyage." Whither the great navigator and his companions went and what became of them — whether they died of starvation, or were crushed in the ice, or were drowned, or frozen to death, or reached land and perished from the fury of the natives — no one knows. The mutineers — such as escaped starvation and the attacks of the Esquimaux — reached Ireland September 6, 1611. Returning to England they were at first imprisoned; but later they appear to have been released without further punishment.

All four of Hudson's recorded voyages were failures so far as their original object was concerned, for he discovered neither a northeast nor a northwest passage to the East Indies, but their secondary results were very important. His discoveries of the arctic whale fisheries in his first two voyages led to the establishment of very valuable sea industries both among the English and the Dutch. The third voyage led to the settlement of New Netherland. And the fourth led to the very profitable traffic with the natives of Hudson's Bay which is still maintained by the great Hudson Bay Company.

Hudson Enters the Employ of the Dutch

Prior to entering the service of the Dutch in 1609, Hudson had had relations with that group of geographical investigators (including the Rev. Peter Plantius, one of the most eminent students of geography in Europe; and Jodocus Hondius, a scientific map-maker and friend of Hudson's), whose researches made Amsterdam the center of geographical science at that time. This is evident from the endorsement found upon a translation of a sailing treatise written by Iver Boty (or Bardsen), showing how to reach Greenland. This treatise was "translated out of the Norsh Language into High Dutch in the yeeere 1560. And after out

of High Dutch into Low Dutch by William Barentson of Amsterdam who was chief Pilot aforesaid. The same Copie in High Dutch is in the hands of Jodocus Hondius, which I have seene. And this was translated out of Low Dutch by Master William Stere, Marchent, in the yeere 1608 *for the use of me Henric Hudson*. William Barentson's Booke is in the hands of Master Peter Plantius who lent the same to me."

This shows that Hudson, a great student of navigation and exploration, had had some connection with the Dutch investigators as early as 1608, and it was natural, after his return from his second voyage, when he was famous for his daring seamanship, that the Dutch should invite him to Holland in the interest of the Dutch East India Company. As the English Muscovy Company, which was probably absorbed in its newly discovered arctic fisheries, put no impediment in the way, Hudson accepted the call and went to Amsterdam.

The Dutch East India Company, which plays such an important part in the story of the exploration of the Hudson river, was composed of six different branches in different parts of the country, each managed by its own board of directors. They were called the Chambers of Amsterdam, Zeeland, Delft, Rotterdam, Hoorn and Enkhuizen. From these chambers was chosen a general Council of Seventeen who were the central governing body.

In the conferences which ensued between Hudson and the Directors of the Company, differences of opinion were developed among the Directors. The Amsterdam Chamber strongly favored engaging Hudson to search for a north-east passage. The Zeeland Chamber strongly objected. It was at length decided to pay Hudson his traveling expenses and send him back home, with a half promise to hire him in 1610.

While all this was occurring, the French minister to The Hague, Pierre Jeannin, at the suggestion of Isaac Lemaire, was secretly urging his royal master Henry IV to avail himself of the opportunity to engage the great English

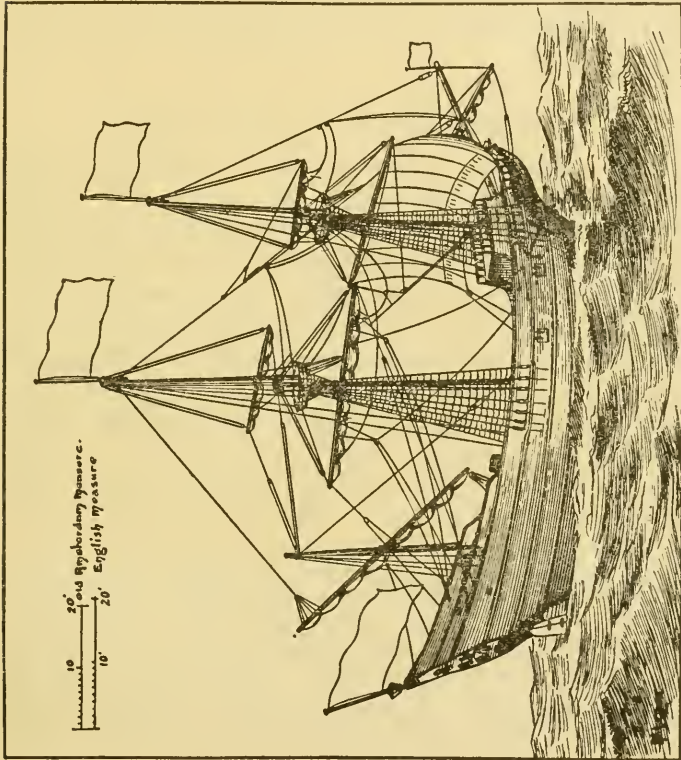
navigator and secure for France the glory of his possible achievements. Learning of this, the Amsterdam merchants perceived the necessity of securing Hudson at once if they wished to prevent his falling into French hands. But they were in a quandary. It would be several months before the next meeting of the representatives of the six chambers of the East India Company, and if they waited, they were afraid they would lose their chance. The Amsterdam Chamber therefore resolved to engage him on their own responsibility.

On the 8th of January, 1609, "the Directors of the Dutch East India Company of the Chamber of Amsterdam," on the one part, and "Mr. Henry Hudson, Englishman, assisted by Jodocus Hondius, on the other part," entered into a formal contract. The Directors agreed to man and equip a small ship or yacht with which Hudson should seek a passage around the northerly side of Nova Zembla, and then proceed eastward until he could sail southward to the latitude of 60 degrees. He was to become acquainted as well as possible with the lands he saw and then return and give a faithful account of his voyage. For this voyage, as well as for the support of his wife and children, the Directors were to pay him 800 guilders or about \$320. If he did not come back inside of a year, they were to give his wife 200 guilders or \$80 more—a rather small policy of life insurance. If, however, he should come back after all, with the good news that he had found a safe passage, they were to reward him as they saw fit. And if, in that case, the Directors should determine to follow up the discovery by other voyages, Hudson and his family were to take up their residence in Holland and Hudson was to accept employment with no other company.

In making this contract, Hudson, who could not speak Dutch, was assisted by Jodocus Hondius as interpreter, and in the Dutch copy of the contract preserved in The Hague—not the original, but a Dutch copy—Hudson's first name is spelled three times "Henry." That was the way in which he signed it, and as he was an Englishman it is a mistake to call him "Hendrick." On February 25, 1906, Governor

Higgins gave his official opinion to the effect that the name should be spelled Henry.

The ship which was fitted out for Hudson was named *De Halve Maene*, or the Half Moon. The people of Holland to-day are building an exact reproduction of that famous vessel and next fall it will be seen in the Hudson



Design of the facsimile of the Half Moon.

river just as its prototype was seen 300 years before. It will seem like a very small boat when it passes the great ocean steamers, 700 feet long, in New York harbor, for it will measure only 74.54 feet over all, 58.70 feet on the water line, 16.94 feet in breadth, and 10.08 feet deep (English measure). It will have three masts. On the foremast will be a square foresail and foretopsail. On the main mast will

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be a square mainsail and maintopsail. On the mizzen mast will be a triangular latteen rigged sail. Across the bow sprit will be rigged a yard from which will hang a square sail called in former times a sprit-sail. The boat, which will be of about 80 tons burden, will be high in the stern and bow and low amidships, and will look different from anything seen in these waters since the facsimiles of Columbus's caravels went up the river bound for the Chicago exposition in 1893.

Hudson's Famous Voyage of 1609

Hudson set sail from Amsterdam on April 4, 1609, (N. S.) with a mixed crew of about eighteen Dutch and English sailors. From the Weepers' Tower, which, like several other landmarks of Hudson's time, still stands in Amsterdam, anxious eyes watched the departure of the little Half Moon on its perilous voyage. Hudson was two days on the Zuyder Zee, then passed the island of Texel and sailed up the coast of Norway. On May 5th he rounded the North Cape,—where in summer the sun can be seen at midnight—and steered toward Nova Zembla. On May 19th, he reached the North Cape again on the return trip, having been baffled by the ice and the refusal of his crew further to attempt to find a northeast passage.

Chagrined at his failure in this direction, and determined to win success somehow, if possible, he proposed to his crew to search for a northwest passage by one of two routes. One route was by way of Davis Strait which had been discovered by John Davis in 1584. The other alternative was to go to the coast of America to the latitude of 40°. This idea had been suggested to him by some letters and maps which his friend Capt. John Smith had sent to him from Virginia and by which Smith had informed him that there was a sea leading into the western ocean between New England and Virginia. It is a curious fact that at this time, North America was believed to be as narrow at this point as it is at the Isthmus of Panama, and the Pacific

ocean was thought to extend eastward as far as New York State.* The crew agreed to the latter proposition and Hudson turned his prow toward the American coast.

Hudson reached the American coast July 12th, and on July 18th anchored in a harbor on the coast of Maine. There he remained long enough to make a new foremast from the pine trees that fringed the shore. Then, his unruly crew having driven the natives from their homes with firearms and plundered them, Hudson resumed his voyage southward. After touching at Cape Cod, he proceeded to a point about 100 miles south of Chesapeake Bay, then turned about, coasted northward, and entered the Delaware Bay. Finding this shallow stream unnavigable he continued up the coast until the daylight of Wednesday, September 2d, disclosed the low, sandy beaches of the northern New Jersey shore, looking like "broken islands."† At 5 o'clock he anchored in sight of the high promontory believed to be the Navesink Highlands on the south side of New York Bay. "This is a very good land to fall with and a pleasant land to see," says Juet at the end of his journal for that day. As New York Bay is regarded as the mouth of the Hudson River, September 2d is the com-

*After it was found that the continents of North and South America blockaded the western route to China, the efforts of the early explorers were directed toward the discovery of a passage *through* North America to the western sea. A singular record of this fact is found in the name of the famous Lachine Rapids. Lachine (or La Chine, as originally written) is the French name for China, and was given in derision to a seignior granted to La Salle on account of his efforts to reach China by way of the Saint Lawrence. What the early explorers failed to discover the United States is making across the Isthmus of Panama—a short western route to the orient.

†The following description is based on the journal of Hudson's voyage kept by his clerk Robert Juet; on the "*Historie der Nederlanden*" (1614) by Van Meteren, who appears to have had access to Hudson's own journal now lost; and on the "*Nieuwe Werelt*" by De Laet who quotes a few words from Hudson verbatim. The references to landmarks by these authorities, however, are so general and the latitudes given are so uncertain, that the data in regard to localities are open to various interpretations. Students should therefore be guarded against accepting positive assertions concerning the precise places of Hudson's anchorages.

monly accepted date of Hudson's first personal acquaintance with the stream which bears his name. On Thursday, the 3d, the Half Moon found good anchorage on the south side of the bay, believed to be inside of Sandy Hook. A week was spent in exploring the adjacent waters with the small boat, during which time the Half Moon appears to have been in the Lower Harbor. In this search, "they found a good entrance between two headlands," (probably the Narrows) "and thus entered on the 12th of September into as fine a river as can be found." They ascended the river as wind and tide served, always anchoring at night. On Monday, the 14th, they "came to a streight between two points," (thought to be the narrow place between Stony and Verplanck's Points) and that day entered the "very high and mountainous" region of the Highlands. On the 15th they "came to other mountains which lie from the river's side," an apt description of the Catskills. By Saturday, September 19th, the Half Moon had reached her "farthest north," which, according to Van Meteren, was in latitude $42^{\circ} 40'$. If this latitude be correct, Hudson's northernmost anchorage was opposite the site of the northern end of the city Albany. From this point Hudson sent the small boat to explore still farther in the hope of finding deeper water beyond, but in this he was disappointed. Convinced that this was not the much desired route to the Pacific, he weighed anchor at noon on Wednesday, the 23d, and started down stream. By Tuesday the 29th, they had reached "the edge of the mountaines, or the northermost of the mountaines" (apparently the north gate of the Highlands) where a stiff southeast gale between the mountains detained them at anchor till Thursday, October 1st. On the latter day they "got down below the mountaines" apparently to the vicinity of Stony and Verplanck's Points. On Friday, the 2d, the Half Moon anchored near "a cliffe that looked of the colour of a white greene." This cliff is one of the most accurately located landmarks in Hudson's river voyage, being without doubt the green serpentine outcrop at Castle Point, Hoboken.

Hudson had now been in the Hudson valley just a month, and was delighted with it. He found the country full of great and magnificent oaks, of a size seldom seen, and an abundance of poplars, lindens and other trees useful in ship-building. He also found blue plum trees. The lands were as pleasant with grass and flowers and goodly trees as ever they had seen and very sweet smells came from them. To use Hudson's own words: "It is as pleasant a land as one need tread upon. The land is the finest for cultivation that I ever in my life set foot upon."

On almost every day of Hudson's sojourn in this delightful region, the Indians visited the ship, either in friendship or hostility. They came in canoes, hollowed out of single logs, some of which were capable of holding as many as fourteen persons. They were dressed in mantles of feathers, deer skins, fox skins and other good furs, smoked great red or yellow copper tobacco pipes, wore copper ornaments on their necks, and carried bows and arrows pointed with sharp stones. They brought with them green tobacco, sweet dried currants, red and white grapes, venison, Indian corn, pumpkins, oysters, hemp, beaver and otter skins, and other things which they either gave ceremoniously to Hudson and his men or bartered for European knives, hatchets, beads and other trinkets.

At various places along his route Hudson visited the native villages, in which he "saw a great store of men, women and children." The aboriginal habitation was a simple structure with an arched roof, made of bent saplings, covered with oak bark. The native bed was a mat of woven rushes, a pile of furs, or a heap of leaves. Corn was the staple of diet from which they made a bread which was excellent eating. Great quantities of corn and beans were dried for winter use. Besides corn and beans and the articles of food already mentioned, they lived on birds and fish. Of the latter the river yielded salmon, mullets, rays and sturgeon in abundance. On rare occasions of the highest ceremony, they cooked a dog.

In general, they were characterized as "a sensible and warlike people, whilst in the highest part the people were

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more friendly." It was noted, however, that they had a "great propensity to steal" and were "exceedingly adroit in carrying away whatever they took a fancy to."

When Hudson landed at various places, he was generally received with marks of distinction. At one place "the swarthy natives all stood around and sung in their fashion."

On another occasion ("in latitude $42^{\circ} 18'$," which, if accurate, would be three miles north of the City of Hudson), the navigator was paid the highest tribute in the range of Indian hospitality by their serving up, with a pair of pigeons and other delicacies, a fat dog. The latter was skinned in great haste with shells which they had taken from the river. When Hudson was about to leave this village, the Indians, thinking it was through fear, broke their bows and arrows in pieces to show their friendliness.

On still another occasion, at Albany, they came aboard with a plateful of venison, made reverence to Hudson, and, presenting him with strings of wampum, "made an oration."

Only those who have lived among the Indians or especially studied their customs can realize the full meaning of these formal ceremonies—the singing, the dog-feast, the oration and the wampum strings.

The friendly relations between Hudson and the Indians of the upper reaches of the river had a far-reaching effect on the history of the State. On August 29—less than a month before Hudson's arrival at the site of Albany,—Champlain and a party of Huron Indians had fought and utterly defeated a party of Iroquois at the head of Lake Champlain. By this battle, the French incurred the bitter enmity of the New York Indians, while in contrast with that conflict, Hudson's friendly feast remained in their traditions for 250 years. The result was that the New York Indians were always more friendly toward the Dutch and English pioneers than toward the French, and the French never obtained a permanent foothold in this State.

While at Albany, the Europeans reciprocated the aboriginal courtesies by giving their Indian visitors wine

and aqua vitae, "so that they were all merrie" and one was made dead drunk. There is something unintentionally pathetic in Juet's record: "And that was strange to them; for they could not tell how to take it."

The relations of the white and red men in the lower reaches of the river were not, however, always of this friendly character. That they were not so, there is reason to believe, was due more to the uncontrollable character of Hudson's mixed crew than to the master himself. The first conflict occurred on September 6th while the Half Moon was in the Lower Harbor and while John Colman and four others in the small boat were away exploring the neighboring waters. In some way, Colman's party incurred the hostility of the natives and was attacked. Colman was killed with an arrow in his neck and two of his companions were wounded.

International relations were further strained on the 9th when three Indians who were visiting the Half Moon in a friendly way were made prisoners. One jumped overboard and the other two were dressed in red coats. On the morning of the 15th, while in the Highlands, these two crawled out of a port-hole and swam away, to make trouble later.

On October 1, after the Half Moon had "got down below the mountaynes" (or Highlands) on the return trip, an Indian, who had climbed up by the rudder to the cabin window, was caught stealing Juet's pillow, two shirts and two cartridge belts. Thereupon the mate shot and killed him. The other canoes near the ship fled, some of the occupants jumping out and swimming for shore. The ship's boat was manned and put out to recover the stolen articles, and when one of the Indians who was in the water reached up and caught hold of the gunwale, the cook cut off his hand with a sword and he was drowned.

After these occurrences, it is not surprising that on October 2d, when the Half Moon was apparently in the vicinity of the mouth of Spuyten Duyvil creek, the Indians came out in force and attacked the white men. In the unequal

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contest between hollowed-log canoes and the 80-ton Half Moon, and between bows and arrows on the one side and firearms on the other, there could be only one result. The Indians were driven off with a loss of eight or ten killed, while the Europeans escaped unscratched to the shelter of the Hoboken cliff of green on the other side of the river farther down.

The Half Moon lay at anchor at Hoboken from October 2d to October 4th, the 3d being very stormy. On the 4th she dropped down the harbor and passed out to sea. Then Hudson and his crew took counsel as to their next move. The Dutch mate suggested that they try for Davis Strait. But Hudson was opposed to that venture now. He lacked some necessary provisions; and his crew were so unwilling and mutinous that at times they had threatened him savagely. He concluded, therefore, that it was best to go back home. So they kept their prow toward the east and on November 7th arrived at Dartmouth, Eng. Thence, after some delay, Hudson went to Holland.

The Hudson River.

The great river which Hudson explored has had many names. It was called Cahohatea and Skanehtade Gahunda by the Iroquois,* Mahicanituc or Mahican river by the Mohican Indians, and Shatemuc by other Indians; Una Grandissima Riviera by Verazzano, (1524), whence Rio Grande, Riviere Grande and Grand River; Rio de San Antonio or River of Saint Anthony† by Gomez (1525); Rio de Gamas by the Spaniards (1525-1600); River of the Mountains by Hudson (1609), or Montaigne Rivier on Dutch maps (1615-1664); River Manhattes by De Laet (1625), or Manhattans Rivier on Dutch maps (1615-1664); River Mauritius or Maurits Rivier from Maurice, Prince of

* Skanehtade Gahunda in the Seneca dialect means the river beyond the openings. The Indians gave the name Skanehtade to the site of Schenectady long before the advent of the whites, referring to the openings between the Hudson and the Mohawk at Schenectady. Gahunda means river.

† Whence, possibly, the name of the mountain just north of Peekskill, called Anthony's Nose.

Orange, during the Dutch period; and the Noort Rivier (Dutch period) or North River (English) to distinguish it from the south or Delaware River.* Hudson's name has displaced all of these except the North river which is applied in a limited way to that portion of the river opposite the City of New York.

The Hudson river is very remarkable in several respects. In the first place, for 150 miles of its length it is not a true river but a fiord. From Albany to the ocean its rock bottom, with the exception of a few islands, is below sea-level. How far below, is not accurately known. Opposite Storm King mountain, where the engineers of the new aqueduct for supplying New York City with water from the Catskills hoped to build a tunnel under the river, they have bored a thousand feet down into the dirt and sand that fill the gorge under the water and have not been able to find rock bottom. The shore line at Albany is at practically the same elevation as the shore line at New York and the tide rises at Albany two and eight-tenths feet. This upward and downward flowing of the tide, of which Hudson took advantage in his voyage, had, of course, long been noticed by the Indians who spoke of the river with wonder as the stream that flowed both ways.

The river is also remarkable for its great natural beauty. The distinguished German surgeon Dr. Adolf Lorenz, while visiting on its shores in 1902, pronounced it more beautiful than the Rhine. This beauty, so famous throughout the world, is due to very ancient causes; and the person who will search beyond the surface appearances for those causes will truly find, as Shakespeare says, "sermons in stones and books in the running brook." The variety of the Hudson's scenery is due to the extraordinary range of its geological history. From its source to the sea it is an epitome of creation. It rises in the Adirondack mountains which, now towering to a height of 5,402 feet, although once much

* The late John Fiske, in his "Dutch and Quaker Colonies" expresses the opinion that the Hudson is also identical with the River of Norumbega, but it does not appear to the present writer that the identity is satisfactorily established.

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higher, lifted their heads above the great primeval flood when almost all the rest of the United States was still a wild waste of waters. The famous Highlands of the Hudson, between which Hudson sailed 300 years ago, are of the same ancient Archæan rocks and were once a group of islands. The Catskills are more modern and the Palisades still younger. The latter were once a fiery, molten mass, and their columnar shape is due to the manner in which that mass cooled off. These few facts will indicate what a storehouse for fascinating research the Hudson valley is for the person, young or old, who will study it with the mind as well as the eye.

Civilization followed Hudson's voyage into the Hudson River valley, partly because the valley was beautiful and attractive, partly because it was fertile, partly on account of the very valuable fur trade which was the foundation of New York commerce, and partly for other reasons, but very largely on account of the relation of the river to other lines of water travel. Before the white man's advent, an Indian could start from New York harbor, paddle up the Hudson to Fort Edward, thence up a little creek, and, making a short carry, resume his journey down Wood creek* and pass through Lake Champlain and the Sorel river to the St. Lawrence. Thence he could ascend to the Great Lakes or descend to the Atlantic ocean. Or, going up the Hudson and Mohawk, with a short carry at Rome, he could proceed down another Wood creek and by way of Oneida lake and the Oswego river to Lake Ontario, and thence, either to the ocean or to the remotest regions of Lake Superior. The same geological forces which produced this network of water connections also formed the almost level terrace along which the Indians instinctively made their great east and west trail from the Hudson to Lake Erie, and along which, at a later date, the white men built the Erie canal. The remarkable situation of their territory with relation to the Hudson river and these other waters was a

* The Champlain canal now connects the Hudson river and Lake Champlain by this route.

leading factor of the preeminence of the Iroquois, the most powerful aboriginal people in America north of Mexico, and, with the advent of European civilization, has been one of the most potent causes of the preeminence of New York as the Empire State. It is only when this is realized that we can fully appreciate the importance of Hudson's services to civilization in making a river with such resources known to the world.

Hudson's voyage was followed immediately by the advent of Dutch traders who built temporary habitations on Manhattan Island and at the site of Albany and at these trading posts carried on a lucrative fur trade with the Indians. In 1620, the Puritans in Holland asked permission to go to the North river to settle, and although the permission was refused, they actually started out for New Netherland. Rough weather, however, compelled them to take refuge inside of Cape Cod, and they eventually settled at Plymouth instead of on Manhattan Island.*

Although a few traders' huts had been erected at Manhattan as early as 1613, and also at the site of Albany about that time, it was not until 1624 that a permanent settlement was effected at Albany and 1626 at New York.

From that time the Colony grew steadily. New Netherland was captured by the English in 1664; recaptured by the Dutch in 1673; and repossessed by the English in 1674. For over a century it remained a colony of Great Britain. Then came the American Revolution and American Independence. In 1807, twenty-four years after the evacuation of New York by the British, occurred the other great event which the Hudson-Fulton celebration commemorates, namely, the successful application of steam to navigation by Robert Fulton on the river which Hudson had explored.

* Bradford's "History of Plimouth Plantation" says: "After longe beating at sea, they fell with that land which is called Cape Cod. . . . After some deliberation they tacked aboute and resolved to stand for ye southward (ye wind & weather being faire) to finde some place aboute Hudsons river for their habitation. But after they had sailed yt course aboute halfe ye day, they fell amongst deangerous shoulds and roring breakers. . . . and as they conceived them selves in great danger, they resolved to bear up againe for the Cape."

PART II.

THE INVENTION OF STEAM NAVIGATION.

The State of Naval Science Before Fulton's Invention.

When, in the morning of Creation, the waters under the firmament were gathered together and the dry land appeared, not only was a habitation for man prepared, but limits were set to his natural movements. To overcome the natural barriers which the oceans, seas, lakes and rivers of the earth presented, he has applied his God-given faculties ever since.

To appreciate the vast importance of the successful application of steam to navigation by Robert Fulton, one must compare the giant stride which has been made in that science in the 102 years since the voyage of the Clermont with the thousands of years of slow progress before the invention of the steamboat.

The Hudson river has seen every stage of nautical development, from the earliest to the most modern. The first attempts at navigation by primitive man were doubtless by means of a floating log. Then he learned to hollow the log by fire and later to construct his boat from the bark of the tree. The first natural source of power for propulsion was the human muscle. The second source of power was the wind, and the first sails were the leafy boughs of trees and the skins of animals. With the art of weaving came cloth sails. After the lapse of thousands upon thousands of years, we find at the beginning of the Christian era that human muscle and the winds were still the only means yet employed for the propulsion of ships. The galleys of Imperial Rome sailed the Mediterranean and ventured as far as Britain; but the ocean was a sea of darkness which their imagination peopled with horrible monsters, and to enter which they believed meant certain death.

Nearly fifteen hundred years more elapsed before the great mariner appeared who dared brave the unknown ter-



ROBERT FULTON

From painting by Benjamin West in possession of Fulton's grandson, Mr.
Robert Fulton Ludlow of Claverack, N. Y.

rors of that sea; but Columbus' voyage, occupying 36 days from the Canaries to the West Indies, was the triumph of this personal character, genius and courage and not of any new invention in navigation, for his little caravels did not differ from similar vessels of the period, and while they showed the progress that had been made in ship-building in fifteen centuries, yet they were subject to all the vicissitudes of wind-blown ships.

Another century elapsed and Hudson's yacht entered New York harbor and spent five days sailing over the course to Albany, which Fulton covered in thirty-two running hours in August 1807, and which the modern steamboat covers in nine and one-half hours. But still no new force had been discovered or invented up to Hudson's time. Even the triangular jib and fore-and-aft sails had not been devised nor could a ship perform the paradoxical feat of later sailing vessels of "sailing on the wind." It took Hudson 34 days to sail from Sandy Hook to Dartmouth, only two days less than Columbus consumed between the Canaries and West Indies.

Time rolled on and nearly two more centuries elapsed. The sailing vessel was developed to a high degree of perfection, and the full-rigged ship as she stood up New York harbor at the beginning of the 19th century was truly a beautiful and impressive sight with her cloud-like masses of canvas swelling in the breeze. But still she was the slave of old King Æolus and could move only by his favor. She had no independence of action, no automatic power of motion; and it took her about as long to cross the ocean as it took Columbus and Hudson. It was not only from the political slavery of some powerful earthly monarch, but from the slavery of the winds, that the seas were now about to be emancipated by the aid of Robert Fulton.

In the year 1765, the year of Fulton's birth, the thoughtful mind of a Scotch youth of 29 years living in Glasgow was turned toward the inventions which were to make it possible for Fulton to revolutionize the art of pro-

elling vessels. The history of science and invention is so full of cases in which great discoveries have resulted from the observation of simple things, that we may take this power of appreciating the significance of small things as one of the criteria of a great mind. Thousands of persons had seen that lamp swinging in Pisa cathedral before Galileo found in it the law of the pendulum. Apples have fallen from trees since the Garden of Eden, but it remained for Newton to find in that familiar sight his great discovery of the universal law of gravitation. There were steam engines in operation before James Watt was born, but his alert and comprehending faculties found in the contemplation of a common tea-kettle, according to popular tradition, the suggestions of his great inventions which revolutionized the use of steam and made him the father of the steam engine.

During the next 10 years after Watt's first experiments inventive genius in England and France was actively engaged in developing the steam engine. Then came the interruption of the American Revolution. After the Revolution, a sort of mania for driving boats by steam began to prevail. In 1785, James Rumsey was experimenting with mechanical and steam propulsion, but it was not until 1786 that we find "the first boat successfully propelled by steam in America," according to Admiral Preble, in John Fitch's clumsy contrivance which was tried on the Delaware July 27th of that year. This boat was worked by gangs of oars or paddles arranged in a framework at the boat's sides.

At the conclusion of this paper we shall see why the priority of the experiments of Fitch and others need not deprive Fulton of the distinction which is popularly accorded to him as "the father of American steamboating." But to shut our eyes to the minor successes of Fulton's predecessors is unjust to those struggling and self-sacrificing pioneers, and it is unjust to Fulton himself, for it disqualifies us from forming a true estimate of the genius and character by which Fulton was able not only to solve the profound problems of a new science, but also to inspire the

confidence and command the material resources which were needed to put his ideas into practical operation.

In August, 1787, Fitch ran an improved boat (the second American steamboat) on the Delaware at Philadelphia. On December 3, 1787, James Rumsey ran the third steamboat, according to Preble's tables. This boat, operated at Shepardstown, on the Potomac, was propelled by means of water sucked in at the bow and expelled at the stern by the force of steam. The fourth steamboat was Fitch's which ran from Philadelphia to Burlington in 1788. It was driven by paddles at the stern. In 1789, Fitch tried the fifth steamboat at Philadelphia. It made eight miles an hour and in 1790 ran regularly as a packet. The sixth steamboat was a stern-wheeler, built by Samuel Morey of Connecticut. It sailed from Hartford to New York in 1794, having on board Chancellor Robert R. Livingston and other well-known citizens of New York.

In 1796, Fitch transferred his activities to New York City. In that year he operated on the old Collect pond, which once existed where now the Criminal Courts building and City prison stand, the seventh American steamboat. In comparison with his first attempt the progress of a decade was very apparent. His first production in 1786, though a practical working boat, was a clumsy affair, but one remove from oars worked by hand power. His boat of 1796 combined with the side wheels (which had proved moderately effective on the Delaware) the screw propeller. It has been claimed that both Chancellor Livingston and Fulton were aboard of the boat, but Fulton was abroad at this time. It is quite likely, however, that the Chancellor was a spectator if not a passenger.

The model of Fitch's boat in the New York Historical Society, made by John Hutchings of Williamsburgh in 1851, gives an excellent idea of the craft. The boiler consisted of a ten-gallon iron kettle covered with a thick plank lid firmly fastened down by a transverse iron bar. The cylinders were of wood. After she had gone around the pond a couple of times she had to stop and take more

water into her primitive boiler. Fitch was undoubtedly a genius and was working on the right track, but unfortunately could not command the means to pay for the proper machinery.

Another steamboat by Morey on the Connecticut in 1797 comes eighth in order. In the same year Chancellor Livingston appears as more than an interested spectator of others' experiments. The extent to which this great man went into both the theory and practice of steam navigation is realized probably by few. He is remembered for his brilliant career at the bar, on the bench, in the Continental Congress where he was a member of the Committee appointed to prepare the Declaration of Independence; in the office of Secretary for Foreign Affairs; as Minister to France and one of the negotiators of the Louisiana Purchase; but in connection with steam navigation, he is generally regarded simply as the wealthy and generous patron of Fulton. As a matter of fact, if there had been no Fulton, Livingston himself might have been the father of the steamboat.

Living in his once beautiful but now sadly decayed mansion about one and one-half miles north of Tivoli and overlooking the Hudson, he had reflected profoundly on the subject of navigating that stream long before he first met Fulton. The extent to which he had gone into the subject is notably reflected in a letter written in this house January 26, 1799, to President Jefferson, in which the defects of Watt's engine and the principles of steam mechanics are discussed. In March, 1798, he employed one Nisbet to construct a steamboat according to his ideas at a place south of Tivoli called De Koven's Bay; and this was the ninth American steamboat. This year, Fitch died, and the monopoly of steam navigation which the New York Legislature had given him in 1787 was annulled and given to Livingston for 20 years.

The limits of this paper will not permit us to do more than mention by name five other American steamboats which appeared before the Clermont, namely, (10th) Fitch's

boat on the Ohio in 1798 before he died; (11th) the boat built under the joint auspices of Nicholas Roosevelt, John Stevens and Chancellor Livingston in the same year; (12th) Oliver Evans' boat on the Delaware in 1804; (13th) Stevens' boat on the Hudson in 1804; and (14th) Stevens' on the Hudson in 1806.

This brief review, hasty as it is, and which has not taken into consideration similar efforts in England, will give some idea of the intense competition between active minds at this time in the realm of steam navigation and prepare us the better to estimate Fulton's achievement in 1807.

Robert Fulton — 1765 to 1807.

It is a mistake to imagine that Fulton's contribution to science was limited to his achievement on the Hudson river in 1807. His genius had a much wider scope, and while we are ostensibly commemorating the Clermont's trip, we are in fact honoring the memory of a man to the range of whose genius the ocean set no bounds.

In a pamphlet entitled "Torpedo War, or, Submarine Explosions," addressed to President Madison in 1810, Fulton adopted as his motto, "The liberty of the seas will be the happiness of the earth." For that principle England had annihilated Spain's Invincible Armada in 1588. For that principle the United States fought the mother country a second time in 1812-1815. It was a sentiment worthy of a broad mind and a noble character and may be said to have been the Polaris of Fulton's aims and ambitions.

Fulton was born of Irish parents in Little Britain (now Fulton Township), in Lancaster county, Pa., in 1765. As a boy he manifested a decided talent for drawing, and he was frequently employed by Lancaster manufacturers to make designs for guns. He was also expert at calculation, and was occasionally engaged by gunsmiths to calculate the force, size, bore and range of guns. These two talents for drawing and calculation, thus wedded in early life, were never afterward dissociated, and to their fortunate possession was doubtless due in large measure his subsequent successes as an inventor.

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In 1779, he began to show a great fondness for invention. After a fatiguing fishing trip with his friend Christopher Gumpf, one day, he went into retirement for a week; and then reappeared, to announce to Christopher that he was tired of poling a fishing boat, and to exhibit the model of a boat fitted with paddle wheels worked by hand.

At the age of seventeen he left Lancaster for Philadelphia to study landscape and portrait painting and mechanical drawing. By May 6, 1786, at the age of twenty-one he had acquired means to buy a home for his widowed mother in Washington county.

Having thus made filial provision for his mother, and as he was suffering from pulmonary trouble, he was persuaded to go to England for his health and to study art under his former neighbor Benjamin West. But the Genius of Invention which possessed him would not leave him alone to pursue art single minded, and in 1793 we find him engaged on a plan for the improvement of inland navigation, and writing to Lord Stanhope, under date of September 30, 1793, concerning the principles of an invention which he said he had discovered respecting the moving of ships by steam.

In May, 1794, he secured from the British government a patent for a double-inclined plane to be used for transportation purposes. In 1795 he submitted to Lord Stanhope drawings of an apparatus for steam navigation; and in 1796 he published in London a "Treatise on the Improvement of Canal Navigation" by the use of inclined planes and the weight of water to raise vessels from one level to another. It would be interesting to know what Benjamin West thought of his pupil's proficiency in art at this period of his career.

Of the fact that Fulton possessed a decided talent for art, notwithstanding his excursions into mechanics and inventions, we have excellent proof. His portrait hanging in the rooms of the American Society of Mechanical Engineers in New York City, and ascribed to his own brush, is a highly creditable product. In 1797, he went to Paris and painted

the first panorama that Paris ever had. Few visitors to Paris to-day who pass through the Rue des Panoramas and the Passage des Panoramas realize that these names are relics of Fulton's first efforts to support himself in the French capital while developing his plans to overcome England with steamboats and torpedos.

In Paris, Fulton lived with the American Minister Joel Barlow, of whom he painted a fine portrait now owned by Fulton's descendant, Mr. Robert Fulton Ludlow of Claverack. He also designed the illustrations for Barlow's classic poem entitled "The Columbiad."

But the truth of Saint Matthew's saying that "no man can serve two masters" soon became apparent in Fulton's case and Invention eventually won him from Art.

During his first year in Paris he made experiments with torpedoes in the Seine. With a view to discovering a means of applying his torpedoes to the enemy's ships, his thoughts turned to submarine boats, and he proposed to "deliver France and the whole world from British oppression." In the spring of 1801 he went to Brest to make experiments with a plunging boat which he had constructed the previous winter. On July 3, 1801, and on subsequent dates, he gave exhibitions of his boat called the Nautilus, in the harbor. Proceeding under sail a suitable distance from shore, accompanied by three companions, he struck the mast and sails, and plunged below the surface where, on one occasion, he remained four hours and twenty minutes. Under water, the boat was propelled by a machine worked by hand, and the respiration of the crew was maintained by a supply of compressed air in a copper globe.

Interesting as this demonstration was, Fulton realized that to "deliver the world from British oppression" something more than a hand-power submarine boat was needed.

In 1801 Livingston arrived in Paris as Minister Plenipotentiary. Livingston was conversant with everything that had been attempted and accomplished in America, and Fulton with everything of a similar nature in England. The coming together of these two men marks a turning

point in history. Fulton had genius. Livingston had the genius to perceive it. With Livingston's assistance, Fulton designed and submitted to Napoleon in 1803 the plans for a side-wheel steamboat. This was constructed; but unfortunately, just as he was about to give an exhibition of its powers, it was sunk in the Seine by a heavy wind. A new boat was built, and with it, on August 9, 1803, Fulton achieved a complete and brilliant success. But the former accident had produced a fatal effect. The French commission reported unfavorably and Napoleon missed one of the greatest opportunities in his career. The late Lord Acton, when asked at Cambridge a short time before his death what he considered the most important event in the 19th Century with respect to English history, replied that it was the sinking of Fulton's boat in the Seine, in 1803.

Discouraged by lack of Government support in France, Fulton then returned to England and made demonstrations of his inventions. He devised various methods for sinking ships with torpedoes. One of his methods was to set afloat two clockwork torpedoes connected by a rope, so that they would drift down on either side of the bow of the enemy's ship, lodge and discharge. Another device for affixing the torpedo was by means of a harpoon shot from a gun. Still another device was an anchored trigger-torpedo, to be exploded by contact.

On October 15, 1805, he blew up the condemned brig *Dorothea* in Walmar Roads, near Deal, as a demonstration of the efficiency of submarine explosions. That the English officials appreciated the value of Fulton's inventions appears from their offer of a considerable reward if he would consent to suppress them forever, so that neither his own nor any other country could use them. This he indignantly refused to do, saying, in a paper which he read in August, 1806, to certain gentlemen appointed by the British ministry to confer with him: "At all events, whatever may be your award, I never will consent to let these inventions lie dormant should my country at any time need them. Were you to grant me an annuity of 20,000 pounds

a year, I would sacrifice all to the safety and independence of my country."

He concludes a letter to Lord Grenville as follows: "It has never been my intention to hide these inventions from the world on any consideration. * * * I have ever considered the interest of America, free commerce, the interest of mankind, the magnitude of the object in view, and the rational reputation connected with it, superior to all calculations of a pecuniary nature."

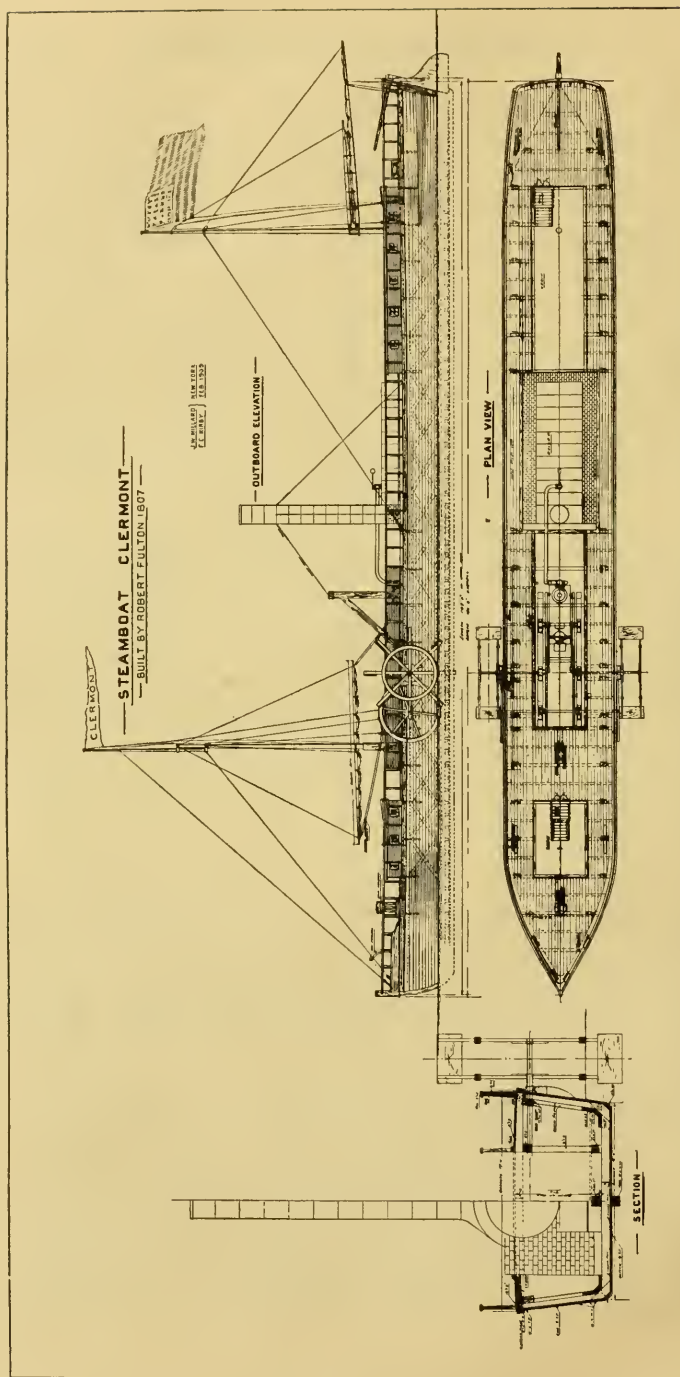
Those noble sentiments entitle Fulton to a place in the foremost rank of American patriots, as his inventive genius placed him in the foremost ranks of American inventors.

The Voyage of the Clermont.

Soon after expressing those sentiments and after having spent about fifteen years in England and France, Fulton returned to New York. The city of a century ago had a population of only about 80,000 souls. It ranked second to Philadelphia. Its closely settled portion was below the latitude of City Hall, with straggling buildings along the Bowery, Broadway and Greenwich street as far north as the latitude of Greenwich. Greenwich was closely settled and included the State's Prison from the neighborhood of which the Clermont started.

On March 10, 1807, Fulton took lodging at Mrs. Loring's fashionable boarding-house at No. 13 Broadway. In 1809 and 1810 he lived at No. 100 Reade street; in 1811 at 133 Chambers street; and from 1812 to the time of his death in what is now called Battery place, in the rear of No. 1 Broadway. There was a vacant lot between his house and No. 1 Broadway.

Before returning to New York Fulton had ordered from Watt and Bolton in England the engine for a new steamboat which, upon his arrival, he began to build at Charles Brown's shipyard near Corlear's Hook and which he called the Clermont. In the Hudson-Fulton Celebration there will be an accurate reproduction of that historic vessel, the result of the most critical, painstaking and thorough in-



Plan of the Clermont as she will be reproduced by the Hudson - Fulton Celebration Commission.

vestigation that was ever applied to such a problem. The task of ascertaining the appearance of the Clermont a century after she was built was not an easy one, for the reason that while drawings of her engine were in existence, there was no contemporary picture of her hull. But from Fulton's statement concerning his first boat in the specifications upon which he obtained his second patent of October 2, 1810,* and from other sources the following facts are now perfectly established: The original Clermont was 150 feet long and 13 feet wide, with 7 feet depth of hold. She drew 2 feet of water. Her hull (below the deck) had wedge-shaped bow and stern, cut sharp to the angle of sixty degrees. In horizontal plan her sides were parallel and she was almost wall-sided, being a very little wider on deck than on the bottom. Her bottom was flat with no keel, and she had two steering-boards or lee-boards to prevent drifting sideways. She had two masts, but no bowsprit or figurehead. She had two cabins, one forward and one aft. The tiller by which she was steered was at the back end of the after cabin so that it was difficult for the helmsman to see what lay ahead. The engine, which was made in England, was amidship between the two cabins and was uncovered. The boiler was of copper. The paddlewheels, 15 feet in diameter, were uncovered, which resulted in drenching the passengers, and no guards protected the wheels from collision. Later, the paddlewheels were covered. To turn around, one paddlewheel was disconnected. The flywheels of the engine were outside of the hull forward of the paddlewheels, and revolved the same way. On one occasion, when one of the paddlewheels was disabled, it is said, paddles were attached to the flywheel and the voyage continued. In the winter of 1807-1808 the Clermont was widened to 16 feet on the bottom and 18 feet

* Contained in "A Sketch of the Origin and Progress of Steam Navigation" by Prof. Bennet Woodcroft of London (1848) who was a distinguished authority on patents.

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on deck to give her greater stability and she was otherwise improved.

A few days before August 17 of that year, this strange looking craft was taken around from the East River to the North River and moored near the old State's Prison, which stood on the square now bounded by Washington, West Tenth, West and Charles streets.

At length, on Monday, August 17, the American Citizen contained this momentous announcement :

" Mr. Fulton's ingenious Steam Boat, invented with a View to the Navigation of The Mississippi from New Orleans upwards, Sails to-day from the North River, near The State Prison, to Albany, The Velocity of The Steam Boat is Calculated at 4 miles an hour ; it is said that it will make a progress of two against The Current of The Mississippi ; and if so it will certainly be a very valuable acquisition to the Commerce of the Western States."

That morning, the shore of the river was crowded with thousands of citizens, many of whom had come to deride what was 'called " Fulton's Folly." Jeers and cat-calls saluted Fulton's ears, and the waggishly inclined significantly tapped their foreheads. " God help 'you, Bobby!" cried one. " A fool and his money are soon parted " cried another. " Bring us back a chip of the North Pole " facetiously shouted another.

Fulton, pale, but with an air of confidence, went about his preparations to start. Presently, 'dense volumes of smoke began to pour forth from the smoke-stack. The boiler began to hiss. At 1 o'clock the hawser was drawn in, the throttle opened, and to the accompaniment of the stertorous exhaust, the uncovered side-wheels began to quiver, then slowly to revolve. A hush fell on the spectators. Fulton's own hand at the helm turned the bow. The Clermont moved out into the stream, the steam connections hissing at the joints, the crude machinery thumping and groaning, the wheels splashing and the smoke-stack belching like a volcano. The boat continued to gather momentum and move away. Then the nervous tension of the

situation was broken. All on board swung their hats in the air and gave a cheer, and like an echo, magnified a thousand times, came back a roar of applause from the shore. Skeptics had been converted. Those who came to scoff remained to cheer. The Clermont was a success, and steam navigation in America was established beyond peradventure.

As the steamboat proceeded up the river, it spread consternation among superstitious mariners and unsophisticated countrymen. No such sight had ever been seen before. The pine wood used for fuel produced a torrent of black smoke, flame and sparks, which belched forth to a great height above the smoke-stack. The reverberation of the exhaust as the boat passed the Palisades was something absolutely unheard before by human ears in this region. Crews of other vessels were terrified. Many at first sight fell on their knees, disappeared below decks or made for land. One honest countryman, after beholding the unaccountable object from the shore, ran home and told his wife that he had seen "the Devil on his way to Albany in a saw mill." Not since Hudson's Half Moon had sailed over the same course nearly 200 years before, exciting the wonder and awe of the aborigines, had such an amazing sight been seen by the neighboring inhabitants.

When the Clermont reached Haverstraw Bay, says one of the passengers, a man in a skiff lay waiting for it. He appeared to be a miller, and the paddle-wheels attracted his attention. He asked permission to go aboard and Fulton ordered a line to be thrown to him. The miller said he "did not know about a mill going up-stream and came to inquire about it." One of the passengers seeing through the simple-minded visitor, but without disabusing him of his mistake, showed him all the machinery and contrivances and the device for throwing the wheels out of gear when the mill was required to come about. Presently the visitor said, "That will do. Now show me the millstones." "Oh," said the passenger, "that is a secret which the master has never told us yet; but when we come back from Albany

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with a load of corn, then if you come aboard, you will see the meal fly."

At 1 o'clock on Tuesday, the boat arrived at the place after which Fulton, in honor of his distinguished colleague, had named the steamboat. Clermont dock, the landing place at Chancellor Livingston's place, is 110 miles from New York, and that distance had been traversed against the wind in just 24 hours. The average speed thus far had been about 4.6 miles an hour. Here Fulton rested from 1 o'clock Tuesday until 9 a. m. Wednesday. His feelings of elation can readily be imagined. His voyage thus far had been one of triumphant success. This was the first time the waters of the Hudson had been churned by steam power from the briny depths of New York harbor to the fresh-water reaches of the upper river. It was the first all-night steamboat trip ever made.

Resuming their journey the next day, Wednesday, at 9 a. m., the Clermont reached Albany, distant 40 miles, at 5 p. m. The running time for the whole 150 miles had been 32 hours, or at the rate of nearly 5 miles an hour. The return trip on Thursday and Friday was made in 30 hours running time, or an average of just 5 miles an hour. The wind had been against the Clermont both ways, says Fulton, so that no advantage could be derived from his sails. The whole journey, therefore, had been performed by the power of the steam engine.

On Saturday, August 22, the American Citizen bestowed upon this extraordinary achievement the following thirty-seven words of comment:

"We congratulate Mr. Fulton and the Country on his success in the steam boat, which cannot fail of being very advantageous. We understand that not the smallest inconvenience is felt in the boat either from heat or smoke."

Fulton's Subsequent Career

Fulton's victory was won by a narrow margin, for competition was following close upon his heels, and could John Stevens of Hoboken and his son, Robert L. Stevens, have

obtained engines in time, they might have anticipated the *Clermont*. As it was, Stevens' *Phoenix* sailed upon the Hudson only a few days later than the *Clermont*, in 1807, but as a result of the monopoly which Livingston and Fulton secured from the Legislature in 1808, Stevens was crowded out, and in June 1809 he took the *Phoenix* around Cape May to the Delaware upon which she plied many years between Philadelphia and Trenton. She is claimed to have been the first ocean-going steamboat.

Contemporaneously with the building of the *Clermont* and of other steamboats after Fulton's models, the inventor continued to direct his faculties toward the advancement of the science of naval warfare. While the finishing preparations were being made for the *Clermont's* maiden voyage, namely, on July 20, 1807, Fulton, in pursuance of experiments which the United States Government had authorized him to make, blew up the hulk of a large brig in New York harbor with a torpedo. In January, 1810, Fulton appeared before President Madison, ex-President Jefferson, and a number of members of Congress, and explained to them his plans and models for torpedoes, and a little later issued an illustrated pamphlet entitled "Torpedo Warfare, or Submarine Explosions."

Livingston, after viewing Fulton's submarine experiments, said: "Upon the whole, I view this application of powder as one of the most important military discoveries which some centuries have produced."

There is no doubt but that the Royal Navy officers who witnessed Fulton's demonstrations in 1805 had a wholesome respect for his devices, and exercised a corresponding discretion in approaching our waters during our second war with Great Britain.

In 1808, Fulton built the *Car of Neptune*, and in 1811 the *Paragon*, the third of the Fulton-Livingston line of Hudson river boats. The *Paragon* was a great improvement on her predecessors. She was 173 feet long with 27 feet breadth of beam. She had a copper boiler 21 feet in length, fitted with numerous pipes to facilitate the genera-

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tion of steam, something after the modern tubular system, but owing to some injury to the pipes from fire on the first experiment they were abandoned. The *Paragon* ran many years between New York and Albany; but about 1820 she ran upon a rock and was abandoned. The round trip from New York to Albany and return on the *Paragon* as on the *Clermont* cost \$14. To-day the same trip can be made for \$3.50.

In 1812, Fulton started his first ferry-boat. The enterprising Stevens had started a ferry to Hoboken in October the year before, but eventually had to give way to Fulton. Of Fulton's boat which ran from Cortlandt street to Jersey City, Fulton said: "It crosses the river, which is a mile and a half broad, when it is calm, in 15 minutes; the average time is 20 minutes. She has had in her at one time 8 four-wheeler carriages, 29 horses and 100 passengers, and could have taken 300 persons more."

This boat was built on the catamaran principle, consisting of two boats, each of 10 feet beam and 80 feet long, separated from each other by an interval of 10 feet, and covered with a deck 30 feet wide and 80 long. The paddle-wheel was in the space between the boats, protected from ice and collision. She was symmetrical at both ends, and, having a balanced rudder at each, was not obliged to put about on the return trip. Thus we see that our simple end-wise system of receiving and discharging ferry passengers, which excited the admiration of some English visitors not long ago, dates from the very beginning of steam ferriage. Fulton also devised the ferry bridge almost precisely as used in its elements to-day. It was attached to the wharf by a horizontal hinge, the outer end resting on a float which rose and fell with the tide. He provided, in addition, an ingenious bumper with hydraulic counter-weights to receive the impact of the arriving boat, which in later years proved to be unnecessary.

Fulton's estimate of the expense of running a steam ferry-boat for one year is very moderate compared with the expense of a modern ferry:

2 firemen at 30 dollars a month each, they finding themselves. They will also act as engineers to keep the engine in order. They must be engaged for the year, as such men cannot be turned away in the winter and got in the spring—	
60 dollars a month.....	\$720 a year
Two boatmen to take turns at steering at 25 dollars a month each, 50 dollars a month.....	600
1½ cords of wood for 12 or 13 hours at 4½ dollars a day, to work 320 days...	2,240
Ware, tare and repairs.....	600
Total.....	\$4,160
Robert Fulton	
Jany. 22, 1810.	

The outbreak of the war of 1812 with Great Britain naturally turned Fulton's thoughts again to his purpose to rid the seas of British oppression. John Bull well knew Fulton's ingenuity and constructive ability, and we may be sure that he kept a particular eye on Fulton's activities. It is possible that the immunity of New York City during the war was partly due to the wholesome fear that some of Fulton's submarine contrivances might be hidden under the waters of New York harbor. In March, 1814, Congress authorized the construction of the first steam vessel of war according to plans submitted to Fulton, and this vessel, called the *Demologos*, or *Fulton the First*, was launched, but not completed, October 29, 1814. She was built, like his ferry-boat, on the catamaran principle, and consisted of two hulls, 66 feet long, separated by a channel 15 feet wide. The paddle-wheel was within this central channel. She had a parapet 4 feet 10 inches thick; port-holes for 30 32-pounder guns; two bowsprits and jibs; two masts; and four rudders, one at each end of each hull.

The launching of this vessel was a great event in New York. Multitudes crowded the shores, and the river and bay were filled with vessels of war dressed in all their colors. In their midst was the enormous floating mass, saluted by land batteries, bands of music and the cheers of

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the people. The enemy had endeavored to prevent the building of the frigate by blockading the port and cutting off necessary supplies, but he only succeeded in increasing the expense. The vessel was completed; equipped with guns opportunely captured from the British and transported over miry roads from Philadelphia to New York; and on July 4, 1815, she made a trip to sea and back, a distance of 53 miles, in 8 hours and 20 minutes. But on February 17th, the treaty of peace with Great Britain was ratified at Washington and the war was over.

Meanwhile, England had evidently sustained a great fright, if we may judge from the English newspaper accounts of the *Demologos*, which declared her to be 300 feet long and 200 feet wide, with sides 13 feet thick, carrying 44 guns, and able to discharge 100 gallons of boiling water a minute. Furthermore, she could brandish 300 cutlasses with the utmost regularity over the gunwale, and dart 300 heavy iron pikes of great length from her sides with great force and withdraw them every quarter of a minute!

Fulton, while present at the launching of the *Demologos*, did not live to see her completed, but died Thursday, February 23, 1815, at his home which stood in what is now Battery Place, in the rear of No. 1 Broadway.* In January, he had caught a severe cold while at Trenton attending a hearing before the New Jersey Legislature involving the right of John R. Livingston to run a ferry-boat between New York and New Jersey. Returning from Trenton, he found the river full of ice, and he was detained on the water several hours on a very severe day. Notwithstanding the cold he had caught, he was so intensely interested in the completion of the frigate that he disregarded the proper precautions for his health. He spent many hours in inclement weather on the decks of the *Demologos*, supervising the work, and at last succumbed, the victim of his devotion to his great work.

* The date and place of Fulton's death above given though differing from those given by his biographers Colden and Reigant are authentic, being based upon obituary notices in contemporary newspapers and upon the city directory of that year.

On the day following, while minute guns boomed from the frigate and the West Battery (now the Aquarium,) his body was escorted to Trinity Church by all the officers of the national and state governments then in the city, by the city magistrates and common council, by several societies, and by a greater number of citizens than had been collected on any similar occasion before. It now rests in the Livingston vault on the south side of Trinity Church, about four rods northwest of the modest monument and tablet erected to his memory by the American Society of Mechanical Engineers in 1901.

An Estimate of Fulton's Genius

If we could assemble in New York harbor a fleet embracing all the steam vessels constructed by Fulton or according to his plans, we should have an impressive exhibit of his productive powers. First we would see the little diving Nautilus (1801) whose name significantly recalls that of Jules Verne's creation in "20 Thousand Leagues Under the Sea." Then would come the little boat on the Seine (1803), and then the Clermont (1807), Car of Neptune (1808), Rariton (1809), New Orleans (1811), Paragon (1812), Firefly (1812), Jersey Ferryboat (1812), Camden (1812), Washington (1813), York Ferryboat (1813), Richmond (1814), Nassau Ferryboat (1814), Fulton (1814), Vesuvius (1814), Demologos (1814), Aetna (1815), Buffalo (1815), Mute (1815), Olive Branch (1816), Empress of Russia (1816), and Chancellor Livingston (1816).

But even this exhibit would represent only a part of Fulton's genius, which expressed itself in his valuable pioneer work with submarine boats, torpedoes, inland canals, and in other directions for the promotion of the peace and prosperity of mankind.

Recalling again the thought formerly expressed concerning the hundreds of centuries of slow advancement in the science of navigation with sailing craft, we cannot fail to be deeply impressed with the immense progress made with steam navigation since it was established on a commercial

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basis by Fulton 102 years ago. The little Clermont of 1807, which could carry 100 persons to Albany in 30 hours at \$7 a head, has developed into the modern floating palace which can carry 5,000 in 9½ hours, at the rate of \$1.75 each.

The Paulus Hook ferry-boat of 1812, which could cross the North River in 20 minutes has grown into the superb twin-screw municipal ferry-boat, costing \$376,000 to build, which can go from South Ferry to Staten Island, a distance of five miles, in the same time. It costs \$192,908 a year on the average to run one of the modern Staten Island ferry-boats against Fulton's estimate of \$4,160. The salaries and wages of crews and terminal hands amounted in 1906 to \$93,231 per boat against \$1,300 a year estimated by Fulton; and the fuel cost \$45,156 per boat, against Fulton's estimate of \$2,240. Two firemen (who also acted as engineers) and two boatmen (who also acted as pilots) comprised Fulton's running force. Each Staten Island boat has three crews of 21 members each, who serve eight hours each. A municipal ferry-boat can carry 2,500 passengers against Fulton's 400. Although the ferry system across the North and East River is now falling into disuse, in consequence of the building of bridges and tunnels, it has been of enormous influence in the development of the city. An idea of the extent of the ferry traffic of the city at the end of the first century after Fulton's achievement of 1807 may be gathered from the fact that in 1907, all the ferries of New York city carried 216,932,549 passengers, of whom 126,294,239 crossed the North River, 12,716,300 were carried by the Municipal Ferries in the harbor, and the balance were carried by all other ferries.

Passing around into the East River to the U. S. Navy Yard, opposite the place where Fulton's armed frigate was launched, we find more material for thoughtful comparison. In the Wallabout Bay, ever memorable for the sufferings of the prison ship martyrs which Fulton so graphically illustrated in the Columbiad, lie the powerful successors of the Demologos. In the midst of this ponderous mass of peace-

conserving machines, we may find the submarine off-spring of his plunging Nautilus. And in these craft, we can see the highest development of his torpedoes.

But greater than all, in the opening years of the second century of steam navigation, come the *Lusitania* and the *Mauretania* as if to demonstrate the perfection to which the science of Fulton has been carried in one hundred years. How impressive is the contrast between the beginnings of the two centuries and how diminutive the facsimile of the *Clermont*, 150 feet long, will look this year beside the 790-foot *Cunarders* which have just crossed the ocean in less than five days.*

Looking back over this marvelous conquest of the sea during the past 102 years, we need suffer no compunctions of conscience in freely rendering our tribute to the memory of Fulton as the father of American steamboating. It is true that he did not build the first crude boat propelled by steam, and he was indebted to others for many ideas which he put into successful practice. But we should remember that in the history of invention, as in the history of human events generally, no single event stands forth alone and unconnected with either preceding or succeeding events. All history is a continuous and logical sequence of cause and effect, and each event is at the same time the fruit of past labors and the seed of harvests to come. Galileo, popularly regarded as the inventor of the telescope, was indebted to the prior discoveries of a Dutchman. Huygens, the inventor of the pendulum clock, was the debtor of Galileo who noted the swinging lamp. And in like manner we may recall the obligations of Stevenson, the father of the locomotive, to Watt; Daguerre, the father of photography, to Niepce; Morse, the father of the telegraph, to Joseph Henry (and to Galvani if we wish to trace it back so far); Bell, the father of the telephone, to several persons; and Marconi, the wizard of wireless telegraphy, to Heinrich

* On March 2, 1909, the *Mauretania* reached Daunt's Rock, Queenstown, from New York, having traversed 2,934 miles in 4 days, 20 hours and 2 minutes. This is the fastest trip on record.

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Herz. In invention, as in other affairs, we feel a natural desire to give a personification to great movements. Washington, Wellington and William of Orange are national heroes, not because their achievements were unaided, but partly because they personify the movements in which they were leading factors. And so it is with our heroes of invention. Fulton was indebted to Franklin, Fitch, Stevens and Livingston, both for the lessons of their successes and the lessons of their failures; but the indisputable fact remains that he improved upon their experiments and by his genius and personal character was able to devise the means and command the influence and resources which established steam navigation upon a successful commercial basis. Fulton personifies the great historical movement of steam navigation, and we are justified in yielding with unreserved gratitude the title of "The Father of American Steamboating" to him whose motto was: "The Liberty of the Seas Will be the Happiness of the Earth."

PART III.

GENERAL PLAN OF CELEBRATION

The plans for the celebration of the events described in the preceding pages have been formulated with a view to the international, national, interstate, State and local significance of the events to be commemorated.

The people of Holland, under royal auspices, are building a reproduction of the "Half Moon," to be presented to the Commission manned with a crew in the costumes of the period of Henry Hudson. The reception of this distinguished delegation, together, as it is hoped, with ships and official representatives of foreign nations, will mark the *international* phase of the celebration.

The *national* government will be represented by the Federal troops, the United States navy, and distinguished civil officers.

An *interstate* participation cannot be avoided when two commonwealths, like New York and New Jersey, have so much in common in their geographical, historical, social and commercial relations; and the appointment by Gov. Hughes of fifteen distinguished citizens of New Jersey upon the Commission, as well as the inquiries from New Jersey boards of trade and other sources indicate that such participation is in contemplation.

The *State-wide* observance of the events has been provided for in the preparations for commemorative exercises in all the universities, colleges, schools and learned societies, throughout the State.

* *In the Hudson River Valley*, every county seat from Newburgh northward is preparing actively for one day of local celebration.

In New York city and the Hudson valley south of Newburgh the features of the celebration already in contemplation promise to make it unique in character and of lasting educational value.

The program of the celebration as at present outlined, but subject to modification in details, is as follows:

Religious Service Days.

(Saturday, September 25, and Sunday, September 26, 1909.)

The Commission is of the opinion that in arranging for the celebration the people should not overlook the Divine guidance in the two great events to be commemorated, one of which opened up our State to modern civilization and led to the founding of the City of New York, and the other of which laid the foundation for the vast commerce upon which the prosperity of the City and State so largely depends. It has therefore set apart the first two days for religious observances by those who are accustomed to worship on Saturday and Sunday.

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Reception Day.

(Monday, September 27th.)

The secular observances will begin on Monday, September 27th, with the following features:

General decoration of public and private dwellings from New York to the head of the river.

Rendezvous of American and foreign vessels at New York.

Fac-simile of Hudson's "Half Moon" to enter the river, be formally received and take her place in line.

Fac-simile of Fulton's "Clermont" to start from original site with appropriate exercises and take position in line.

Visiting guests to disembark and be officially received.

Opening of exhibits of paintings, prints, books, models, relics, etc., by the Metropolitan Museum of Art, the American Museum of Natural History, the Hispanic Museum, the American Numismatic Society, the New York Public Library, the New York Historical Society, the New York Genealogical and Biographical Society, the American Geographical Society, Webb's School for Shipbuilders, the New York Yacht Club, and *similar institutions throughout the State*. The exhibitions at the Metropolitan Museum of Art and the American Museum of Natural History promise to be the most remarkable of the kind ever held in this country and will probably extend over a period of several months.

Music festivals in the evening in each of the five boroughs of the city.

On some day or days of this week, there will be a remarkable exhibition of flying machines. The New York World, has offered a prize of \$10,000 for the aeronaut who, with a mechanically propelled airship, sails over the course from New York to Albany traversed by Fulton's first steamboat in 1807. This competition will be conducted by the Aero Club of America, and has been approved by the Commission as a part of the official celebration.

During the week it is planned to have, upon a great float in the Hudson river opposite Riverside Park, New York, an Indian village, in and around which scenes in the early history of New York will be enacted.

Historical Day.

(Tuesday, September 28th.)

On Tuesday, September 28th, there will be an Historical Parade in the City of New York. The procession will be composed of floats and moving tableaux representing the principal events in the history of the City and State. This parade may be repeated in Brooklyn on Friday, October 1.

In the evening, the Official Literary Exercises will be held in the Metropolitan Opera House, the Great Hall of the City College, Carnegie Hall, and the Opera House of the Brooklyn Academy of Music, at which orations will be delivered by men of national reputation.

General Commemoration Day.

(Wednesday, September 29th.)

Soon after the Commission was formed, a World's Fair at or near New York City was suggested. After giving several public hearings the subject was referred to the Plan and Scope Committee, who, in their preliminary report, expressed the belief that the country had been surfeited with such temporary celebrations and voiced the hope that the celebration of 1909 would be conducted on a plan which would leave monumental works of lasting benefit to the people. The ideas thus expressed have received unequivocal expressions of approval from the leading newspapers of this and other States and have been accepted as the policy of the Commission.

It is proposed therefore that Wednesday, September 29th, be devoted to the dedication of parks and memorials along the Hudson River, and to General Commemorative Exercises throughout the State. It is recommended not only that between now and then, the most earnest efforts be made to secure great memorials like Inwood Hill Park, but also that the civic pride of various communities along the river be invoked to participate in like manner by establishing parks, institutions or other public memorials. The interest of the numerous historical and patriotic societies is invited in the erection of monuments and tablets, so that the history of the Hudson Valley may be written in stone and bronze from the site of old Fort Amsterdam to the site of old Fort Orange. The Commission has advices which indicate that monuments to William the Silent and Henry Hudson, a tablet to the Founders and Patriots of New York and a tablet on Fort Tryon will be ready for dedication.

Wednesday is essentially an educational day, designed to be participated in by the universities, colleges, schools, museums and learned and patriotic societies *throughout the whole State*. While the commemoration of 1909 must, from geographical considerations, largely center around the Hudson River, the glory and the material benefits of Hudson's and Fulton's achievements are the heritage of the people of the entire State, and the programme for Wednesday affords a practical means for a general observance of the occasion from one end of the State to the other. Features of this day's observances will be as follows: Commemorative exercises in Columbia University, New York University, College of

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City of New York, Cooper Union, University of St. John at Fordham, Hebrew University, Brooklyn Institute of Arts and Sciences, Public Schools, Historical Societies, and *all the universities, colleges and institutions of learning throughout the State of New York*; with free lectures for the people in New York City under the auspices of the Board of Education.

The programme for this day also includes aquatic sports on the Hudson River, designed in the first instance for friendly competition between the crews of the naval vessels, but which may embrace motor boat races and such other amusements as may seem practicable and desirable. The races on this day will be opposite Riverside Park, New York, and opposite Yonkers. (See also Saturday, October 2.)

Other features of Wednesday's programme will be:

A reception to visiting guests at West Point during the day; and

An Official Banquet in honor of distinguished guests in the City of New York in the evening.

Military Parade Day.

(Thursday, September 30th.)

On Thursday will occur the military parade, participated in by the United States Army, the United States Navy and Marine Corps, the National Guard and the Naval Militia.

Owing to the probable length of this parade, which may contain as many as 25,000 troops, the great fatigue which would be caused to the distinguished reviewing party if required to witness a longer procession, and the difficulties in the way of moving with precision and promptness a larger body if composed of undrilled civilians, it has been deemed advisable to eliminate civic features from this parade.

An evening reception to the official guests at the headquarters of the Department of the East on Governor's Island is suggested as the closing event of the day if it proves agreeable to the authorities.

Hudson River Day.

(Friday, October 1st.)

Friday, October 1st is devoted to the Naval Parade and incidental ceremonies. It appears to be practicable for some of our naval vessels to proceed as far north as Newburgh Bay. It is planned to have as many vessels of the navy, merchant marine, excursion boats, and pleasure craft as possible go from New York

to Newburgh, taking with them the fac-similes of the "Half Moon" and "Clermont."

In order that the inhabitants of the country on either side of the river may see the parade and the reproductions of the historic vessels, we recommend that the day be devoted by them to fêtes champêtres along the river-sides from New York to Newburgh.

As the procession passes up the river, salutes may be fired from eligible points.

The Memorial Arch erected by the Daughters of the Revolution at Stony Point Battlefield will probably be dedicated on this day.

Simultaneously with the advance of the South Hudson Division, it is proposed to have a counter-procession from Albany to Newburgh, the two divisions meeting and holding appropriate ceremonies at Newburgh. Here the "Half Moon" and "Clermont" will join the North Hudson Division.

Carnival Day.

(Saturday, October 2d.)

Saturday, October 2d, is designed for a general Carnival Day in New York city.

The New York division of the Naval Parade will return to its starting point.

In Newburgh bay there will be aquatic sports.

In all the cities this will be peculiarly the Children's Day, devoted to fetes in public and private parks and play-grounds.

The celebration will culminate in New York City in the *evening* with a Carnival Parade. This feature, with its moving allegorical tableaux participated in by all nationalities represented in the City will, it is believed, exceed in beauty and interest the most famous carnivals of Europe. The Carnival Parade will probably be repeated in Brooklyn on some night in the following week.

Brilliancy will be added to the general spectacle by the illumination of the fleet and public and private buildings and a pyrotechnic display. Displays of fireworks at various points, notably on the great bridges as in the fetes of the 14th of July in Paris, are in contemplation.

At 9 P. M. it is designed to have a chain of signal fires from mountain tops and other eligible points along the whole river, lighted simultaneously. An arrangement has been made with the Pain Manufacturing Company as official illuminators, by which local communities can contract for these fires at reasonable and uniform rates.

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Upper Hudson Week.

(Beginning Sunday, October 3d.)

It is planned to devote the week beginning Sunday, October 3d, to celebrations in the communities along the Upper Hudson. This will be somewhat in the nature of an Old Home Week. The events previously outlined will draw many residents of the State to the City of New York and will prevent as full a participation in local celebrations as might otherwise be possible; whereas, in the week following not only will the citizens of the communities outside of the Metropolis be at home, but former residents of those communities will also be freer to make pilgrimages to their old homes, renew old ties and participate in local exercises. Beginning Sunday, October 3d, such portion of the Lower Hudson fleet as can continue the voyage to Troy, together with the North Hudson Fleet and the "Half Moon" and "Clermont," will be subject to the arrangements of the Upper Hudson Committee of the Commission.

Dutchess County Day.

(Monday, October 4th.)

On Monday the naval parade will be at Poughkeepsie, the county seat of Dutchess county, and remain there during the Poughkeepsie Ceremonies. The erection of a statue of Robert Fulton has been suggested as a feature of the Poughkeepsie celebration.

Ulster County Day.

(Tuesday, October 5th.)

On Tuesday, the naval parade will proceed to Kingston, the county seat of Ulster county, while similar exercises take place there. A statue of Governor Clinton has been proposed as the permanent memorial here.

Greene County Day.

(Wednesday, October 6th.)

On Wednesday, October 6, the naval parade will go to Catskill, the county seat of Greene county. It is proposed that the ceremonies here include the dedication of a statue of Rip Van Winkle.

Columbia County Day.

(Thursday, October 7th.)

On Thursday, October 7th, the fleet will continue on to Hudson, which is the county seat of Columbia county and is named after the great explorer. A statue of Henry Hudson is the appropriate memorial proposed at this point.

Albany County Day.

(Friday, October 8th.)

On Friday, the 8th, the flotilla will advance to the Capital of the commonwealth, the county seat of Albany county and the oldest city in the State. A statue of Peter Schuyler, the first mayor of Albany, has been suggested as the permanent memorial here.

Rensselaer County Day.

(Saturday, October 9th.)

In like manner the naval parade will advance to Troy, the county seat of Rensselaer county on Saturday, October 9th, and form the nucleus of the celebration there. A statue of Van Rensselaer, who obtained the first land grant in that section, has been suggested as an appropriate monument to be erected here.

PART IV.
SUGGESTIONS FOR GENERAL COMMEMORATIVE
EXERCISES AND CHILDREN'S
FESTIVALS.

Municipal Authorities and Citizens Generally.

Municipal authorities are requested to cause flags to be displayed on all public buildings during the secular week beginning on Monday, September 27.

Citizens generally are requested to display flags from their houses and office buildings and merchants to decorate their store windows with the national colors and the *colors of the celebration*. The latter are orange, white and blue, the colors of Holland under which Henry Hudson sailed in 1609.

Learned and Patriotic Societies.

On Wednesday, September 29—or on any other day of that week if more convenient—it is recommended that patriotic, historical and other learned societies hold literary exercises bearing on the events commemorated or on the consequences of those events. The leading speakers of the community should be invited to participate.

Exhibitions of books, prints, maps, paintings and relics will be very interesting. Comparative pictures showing the appearance of the locality in 1609 or in 1807 and in 1909 will be instructive.

Historical societies will naturally consider the historical aspects of the events.

Scientific societies may consider the flora and fauna of Hudson's time; Hudson's and Fulton's contributions to the science of navigation, etc.

The preservation of local landmarks and the marking of historic sites is recommended.

Educational Institutions.

All universities, colleges, normal schools, high schools, public schools and private schools are requested to observe Wednesday, September 29, as General Commemoration Day. Programmes

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should be arranged comprising two or more of the following general features :

1. Patriotic songs.
2. Debates.
3. Essays.
4. Tableaux.
5. Exhibitions.

Songs.

The following songs are recommended: "America," "Star Spangled Banner," "Columbia, the Gem of the Ocean," "Keller's American Hymn," "Hail Columbia."

Any good sailor's songs, and songs of England and Holland would also be appropriate.

Songs of other nations, with the display of corresponding flags, would typify the State's welcome to the people of all foreign countries.

Debates.

Debating societies will find material for public debates in both Hudson's and Fulton's achievements. The following subjects may suggest others:

"Was Henry Hudson justified or not in sailing to America in 1609 under his contract with the Dutch East India Company?"

"Were the Dutch or the English best entitled to the territory called New Netherland?"

"Did the presence of Indians in this State on the whole promote or hinder the coming of civilization?"

"If the British had controlled the Hudson river in the War of the Revolution, could the Colonies have won their independence?"

"Which has conferred the greater benefits on mankind, the steamboat or the steam locomotive?"

"Which has had the greater influence of the prosperity of the State, the Hudson river or the Erie canal?"

"Which did the most for the advancement of civilization, Henry Hudson or Robert Fulton?"

Essays and Compositions.

The discovery of the Hudson river and the invention of steam navigation offer a wide range of subjects for essays and compositions. A few subjects are suggested as follows:

"Henry Hudson the Navigator."

"State of Geographical Knowledge in 1609."

"The Sea Kings of England and Holland and what they did for free navigation."

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"Instruments used in navigation in Hudson's time."

"The League of the Iroquois."

"The River Indians and How they Received Hudson."

"Legends of the Indians."

"The settlement of New Netherland."

"The fur trade of New Netherland."

"How the beaver influenced the history of New York."

"Customs of the Dutch settlers."

"The relation of the Hudson River to the history of the State."

"Robert Fulton the Inventor."

"Fulton's Debt to other inventors."

"Progress in steam navigation in 100 years."

"Description of an ocean voyage in 1609."

"The scenery of the Hudson River."

"Legends of the Hudson River."

"The rank of the Hudson River with other rivers of the United States."

"The Influence of the Erie Canal on the development of New York City and State."

"The settlement of _____" (in the blank space insert the name of the town or city in which the writer lives.) This subject is especially recommended to stimulate the study of local history.

Tableaux.

It is difficult to make suggestions for tableaux which will be applicable to all parts of the State, to the different conditions under which they are to be given and to the varying resources of the participants. Tableaux can be given out of doors with natural surroundings which cannot be given in doors; and effects can be produced in a theatre or large auditorium which cannot be had in a schoolroom. Each community must be guided largely by its own history, and each company by its own facilities.

While the primary object of the Hudson-Fulton Celebration is to commemorate the achievements of Hudson and Fulton, it is designed also to stimulate the study of the local history of all the communities of the State. Therefore, any important or picturesque or interesting event in the annals of a town or city may appropriately be represented.

There are no more picturesque subjects than those relating to the Indians. If purely aboriginal life is to be represented, scenes may be given representing passages in the Legend of Hiawatha, which is supposed to depict the origin of the Iroquois. If there is any local Indian legend, it may likewise afford material. Scenes in Indian domestic life; the making of pottery; wooden dishes, bows and arrows, etc.; the stringing of wampum; an Indian meal;

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the gathering of corn; the pounding of corn; Indian games, etc., are admirable subjects for purely Indian characters.

Then there is a range of subjects, as wide as the State, dealing with the contact between the Indians and the white men. The settlers of New York were usually very scrupulous to buy their land from the Indians, even if the price paid was small, so that from the purchase of Manhattan Island by Peter Minuit in 1626 to the Big Tree Treaty on the Genesee by which the Senecas parted with most of their land, there were innumerable incidents of that sort. Then there were a great many councils with the Indians like that on Bowling Green, New York; that between Stuyvesant and the Indians at Albany (Fort Orange); those of Sir William Johnson at Johnstown; those under the Council Tree at Geneva, etc. The dealings of the fur traders with the natives are susceptible of simple and effective representation. Cooper's *Leatherstocking Tales* will suggest several picturesque scenes. Scenes of captivity may also be represented, and an incident like Mary Jemison's arrival in the Genesee country with her Indian babe on her back, could be easily and strikingly portrayed.

Henry Hudson may be represented as signing his contract with the directors of the Dutch East India Company; or studying his globe and charts in the cabin of the *Half Moon*; or debating with his unruly crew near Nova Zembla whether he shall return to Holland or sail for America; or welcomed by the friendly Hudson River Indians. The famous feast, between Hudson city and Albany, when the Indians broke their bows and arrows to show their friendship, would make a striking scene. If facilities are available, a scene based on Collier's painting of "Hudson's Last Voyage" would be affective.

Any phase of Dutch colonial life would be good. A Dutch youth and maiden promenading together or with the youth on his knees before his sweetheart, would represent a Dutch courtship. The rattle-watch—a darkened stage, with a watchman, going about with a lantern and whirling his wooden ratchet—could be easily produced. Men bowling at ten pins; or a Dutch school scene; or features of domestic life, such as spinning, weaving, threshing with a flail, churning by hand, polishing the pewter dishes, and cooking at the old fire-place, are good material to work upon.

What has just been said about the Dutch period is equally applicable to the English colonial period. A tea party of either colonial period could be made very pretty.

In preparing for the presentation of historical scenes, the first essential is to read the local history of the town and pick out its leading events. Some incident connected with the first permanent settlement of each town is particularly recommended. In New York city, the purchase of Manhattan Island in 1626 would represent the beginning of the Dutch period; the surrender of

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Fort Amsterdam by Peter Stuyvesant in 1664 the beginning of the English period; and the reading of the Declaration of Independence to the Continental Army, July 9, 1776 the beginning of the American period. The trial and acquittal of John Peter Zenger (1735) establishing the freedom of the press; citizens signing the nonimportation agreement (1765), citizens burning the British stamps (1765); Washington giving instructions to Nathan Hale (1776); Washington's farewell to his officers (1783) are suggestive of many others relating to colonial and revolutionary times. Where events are of national or state-wide importance there is no reason why one community should not borrow subjects from another. Washington refusing the crown at Newburgh, the adoption of the Constitution at Kingston, the Capitulation of Burogyne at Saratoga, and the making of the first American flag flown in battle at Fort Stanwix (Rome) are events in the latter class.

Almost every community has had one pre-eminent historical character, like Peter Stuyvesant, George Clinton, Peter Schuyler, Kilian Van Rensselaer, Horatio Seymour, William H. Seward, or scores of others who could be named. Such a character, represented in his most famous attitude or act, would make a tableau by itself. Often-times a local statute will convey a helpful suggestion in this direction. "Living statuary," representing a soldier and sailor, would symbolize the civil war.

Robert Fulton's life suggests several subjects, such as taking painting lessons from Benjamin West; working on a steamboat model; making mechanical drawings; conferring with ex-President Jefferson, President Madison and others when he explained his torpedo plans, etc.

Irving's Sketch Book can be drawn upon for Legends of the Hudson river, foremost among which is that of Rip Van Winkle and Henry Hudson's crew in the Catskills.

These hints could be prolonged until they made a volume; but perhaps enough has been said to suggest how to go to work and what subjects are available. The discovery of other appropriate subjects must be left to the studious ingenuity of the participants themselves.

Exhibitions.

School exhibitions may include the following things:

Pictures of Henry Hudson; the Half Moon; Amsterdam; the Dutch people; scenes along the coasts of Norway, Spitzbergen, Iceland, Greenland, Hudson Bay, the Maine coast, and the Hudson river.

Indian relics of all kinds.

Relics of early settlers.

Pictures of Robert Fulton, early and modern steamboats and scenery of the Hudson river.

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Pictures of the locality in which the exhibition is held, showing its early and present appearances in contrast.

Views relating to the Erie canal.

Old maps of North America and New York State, with pins used as markers to indicate voyages of early explorers. A large globe of the earth thus marked would be instructive.

Children's Festivals.

Saturday, October 2d, is the day particularly assigned to the children of the State for out-door festivals.

Places.—These festivals may be held on the rivers, river-sides, village greens, parks, park lakes, roads, boulevards, avenues, streets or parts of streets set aside for occasion, recreation piers, open fields, vacant lots, playgrounds, campuses and athletic fields. If the weather should be inclement or if for other reason it should be advisable to have the festivals under cover, use could be made of armories, large halls, recreation centers and roof gardens.

Form of Festivals.—The festivals themselves may take the form of (a) dramatic presentations, with literature and arts portraying the heroes, the people, the civilization of 1609, and symbols of development—scientific, industrial, social, political, educational. Or (b) they may take the character of aquatic or land processions or pageants with arches, poles, banners, emblems, coats of arms, insignia of all kinds, colors, and streamers, so far as possible to be made by the school children as school work. The symbols should suggest the sources of the Hudson, the different cities and towns in succession blessed by its waters, the various products borne by it for distribution to mankind in all parts of the world; and also the various nationalities which in succession have come to share in the blessings of the river. And (c) there may be home parties for children and young people with costumes, plays, games, charades, etc., illustrative of different features of the places and events.

Rejoicing.—Folk dancing of all nations, in succession and then in unison as one people, is suggested as a form of rejoicing; also historical excursions; tournaments; golf; tennis, and other ball games; all games for kindergarten and older children in parks, in streets set aside for the purpose, in open fields, and vacant lots—wherever individuals or neighborhood committees make it possible for children to play. Separate places should be provided for the segregation of kindergarten and small children. In communities near the Hudson river, the participants should, if possible, hold their rejoicings on the shores of the river and harbor.

Co-operation.—Schools, committees and individuals arranging children's festivals should secure, if possible, the co-operation of departments of education, departments of parks and various other

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departments of government; institutions, playground associations, athletic leagues, clubs, associations, societies, neighborhood leagues and committees. An individual, a committee or a society may select and improve even a vacant lot as a possible place for some form of celebration by children. Each school, institution, club, society, or neighborhood committee should provide a building or a playground and organize for the children of the school or neighborhood various forms of entertainment. The improvement of such vacant lots may lead eventually to the establishment of permanent parks or play-grounds.

Books.

Following is a partial bibliography for the aid of the student. In some of the books mentioned are more extensive lists:

Indians.—Morgan's "League of the Iroquois," and Ruttenber's "History of the Indian Tribes of the Hudson" (rare) are recommended with the following more accessible publications of the New York State Museum: "History of the New York Iroquois," "Aboriginal Occupation of New York," "Polished Stone Articles Used by the New York Aborigines," "Earthenware of the New York Aborigines," "Wampum and Shell Articles used by the New York Indians," "Horn and Bone Implements of the New York Indians," "Metallic Implements of the New York Indians," "Metallic Ornaments of the New York Indians," etc.

England and Holland.—Greene's "Short History of England" and Motley's "History of The Netherlands" will give the relations of the countries prior to and at the time of Hudson's voyages. "Motley's Dutch Nation," by Wm. Elliot Griffis, D. D., L. H. D., condenses into one volume Motley's "Rise of the Dutch Republic" and in addition brings the historical narrative down to 1908.

Early Voyages.—John Fiske's "Discovery of America," chapters I and II of his "Old Virginia and Her Neighbors" and his "Dutch and Quaker Colonies in America" are fascinating reading concerning the sea-kings, western discoveries and American colonization. Volume IV of Windsor's "Narrative and Critical History of America" contains a great fund of information on the subject. "Purchas His Pilgrimes" published in 1625 is difficult of access but useful to the critical student. For individual pre-Hudson voyages, the following "Old South Leaflets," published by the Directors of the Old South Work, Boston, Mass. and costing five cents apiece, are very useful: No. 17, "Verazzano's Voyage;" No. 29, "The Discovery of America;" No. 31, "The Voyages to Vinland;" No. 37, "The Voyages of the Cabots;" No. 115, "John Cabot's Discovery of North America," and others mentioned in their list which is sent on application to them.

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Henry Hudson.—Join Meredith Read's "Historical Inquiry Concerning Henry Hudson" is the most exhaustive investigation of his life, but is rare. Henry C. Murphy's "Henry Hudson in Holland" is also rare. Edgar Mayhew Bacon's "Henry Hudson, his Times and his Voyages" is perhaps the most convenient and accessible modern book on the subject.

Discovery of the Hudson River.—Asher's "Henry Hudson the Navigator" is an exhaustive and critical account of Hudson's voyages with full bibliography, but rare. Purchas' Pilgrims, (rare) reprinted in the New York Historical Society Collections, Vol. I, gives accounts of all four of Hudson's voyages. B. F. De Costa's "Sailing Directions of Henry Hudson" contains a dissertation on the discovery of the Hudson but is also rare. John Fiske's "Dutch and Quaker Colonies in America" is by far the most readable and condensed account of the discovery of the river. Bacon's "Henry Hudson," above referred to, is also excellent. Yates & Moulton's "History of New York" has a running commentary on Hudson's voyage up the river. Old South Leaflet, No. 94, "The Discovery of the Hudson River" gives that portion of Juet's diary of Hudson's voyage relating to the river. The American Scenic and Historical Preservation Society's "Eleventh Annual Report," (1906) contains Juet's Journal, also a fac-simile of Hudson's contract with the Dutch East India Company.

Settlement of New Netherland.—Chapter VIII of Volume IV of Winsor's "Narrative and Critical History of America" is an interesting and condensed account of the Dutch in America, with sources of information and a valuable bibliography. Fiske's "Dutch and Quaker Colonies" should also be consulted. The first volume of Gen. James Grant Wilson's "Memorial History of New York" is the most scholarly and detailed account of the discovery and colonization of New Netherland. Old South Leaflet, No. 69, contains the "Description of New Netherland by Adrian Van der Donck."

The Hudson River.—Lossing's "Hudson from the Wilderness to the Sea" and Bacon's "Hudson River from Ocean to Source" are interesting, descriptive and historical works.

Robert Fulton.—Colden's "Life of Robert Fulton" and Reigart's "Life of Robert Fulton" are the fullest biographies of the inventor, but the date and place of his death are erroneously stated in both. Convenient small books are "Robert Fulton, His Life and its Results," (194 pp.), by R. H. Thurston, and "The Story of Robert Fulton," (120 pp.), by Peyton F. Miller.

Steam Navigation.—The fullest work on this subject is Admiral Preble's "Chronological History of the Origin and Development of Steam Navigation." A brief account is to be found in Old South

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Leaflets, No. 108, "The Invention of the Steamboat." A valuable short book is "A Sketch of the Origin and Progress of Steam Navigation from Authentic Documents" (printed in 1848), by Bennet Woodcroft, Professor of Machinery in the University College of London and editor of the indexes of British patents.

Local Histories.—It is not possible in these pages to give titles of local histories. These should invariably be consulted, however.

The librarians of public libraries will almost always make helpful suggestions to inquiring students.

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